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A GUIDE FOR THE AFLC PROGRAM MANAGER OF MAJOR PRODUCTION CLASS --ETC(U)
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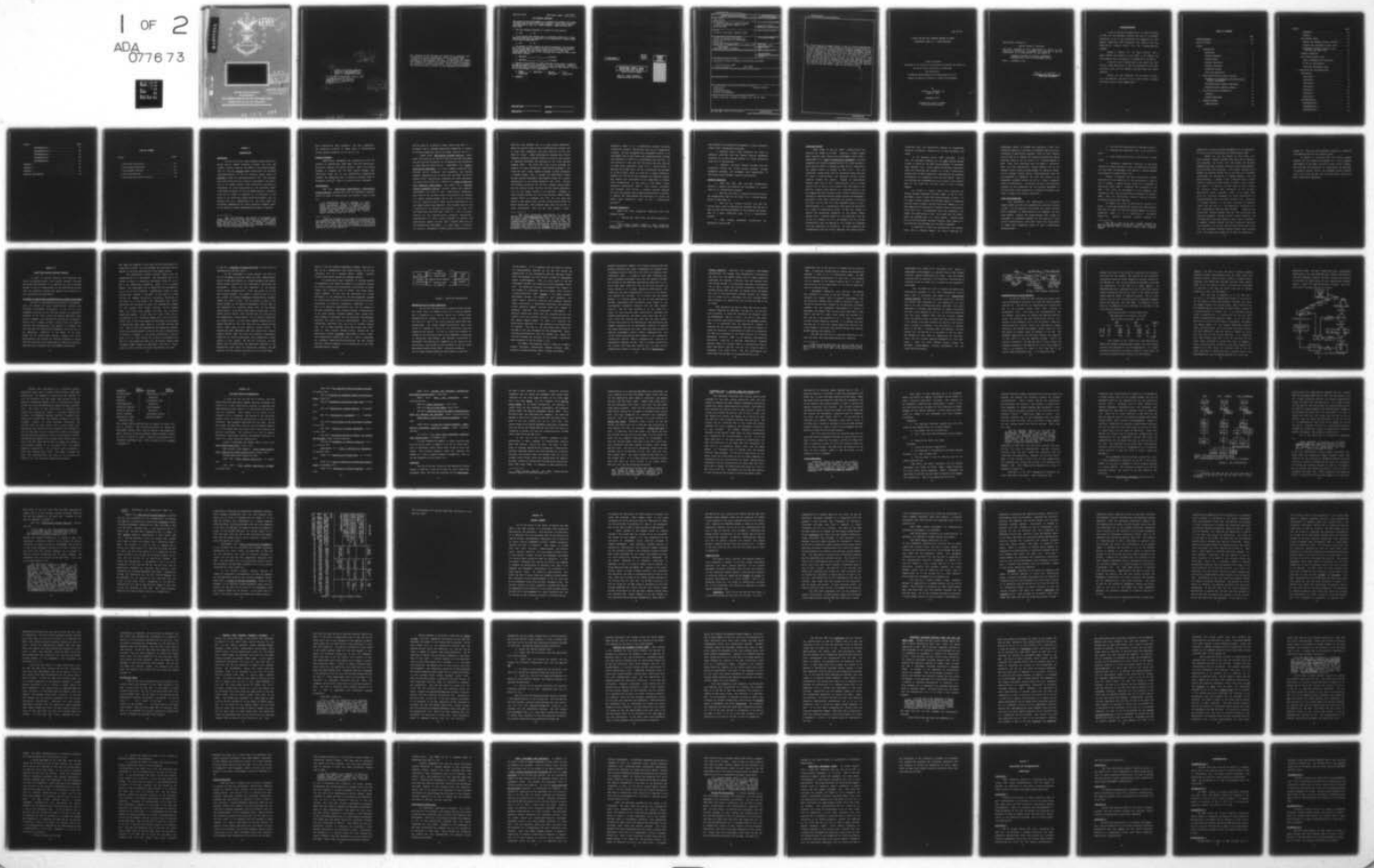

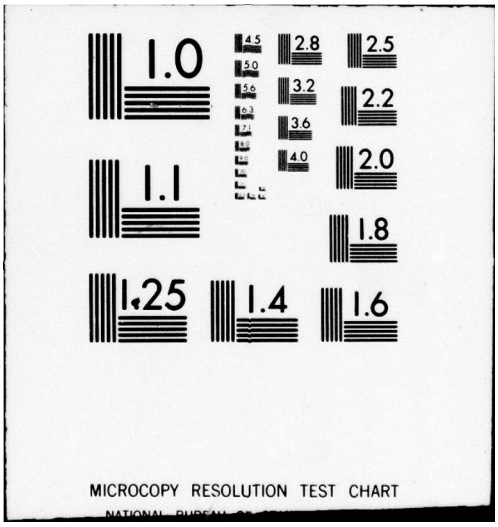
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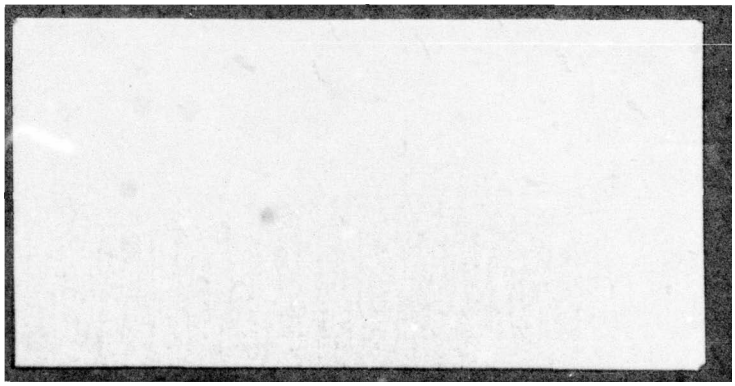

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A GUIDE FOR THE AFLC PROGRAM MANAGER OF MAJOR PRODUCTION CLASS IV & V MODIFICATIONS.

(10) Richard S. MacIsaac, Captain, USAF

(14) AFIT — LSSR-30-79B

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Air Force Logistics Command (AFLC) is the Air Force's Mod Manager. The size, complexity, and production duration of some Class IV & V major modification programs requires program management similar to that required in the acquisition of a major new weapon system. AFLC's organization, and thus directives and policies, are structured to manage modifications that fit the TCTO "kit" mold. A major production modification does not fit the "kit" mold. This AFLC Program Manager's guide bridges the gap between kit and major new weapon system management by describing the Mod proposal and approval process, by identifying DOD directives and policies that affect Mod management, and by providing "lessons learned" from past and present major production modifications.

LSSR 30-79B

A GUIDE FOR THE AFLC PROGRAM MANAGER OF MAJOR PRODUCTION CLASS IV & V MODIFICATIONS

A Thesis Proposal

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

Richard S. MacIsaac, BS
Captain, USAF

September 1979

This thesis, written by

Captain Richard S. MacIsaac

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTIC MANAGEMENT
(INTERNATIONAL LOGISTICS MANAGEMENT MAJOR)

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Thomas W. McCann Jr
COMMITTEE CHAIRMAN

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INTRODUCTION

Background

At each of the four major Defense System Acquisition Review Council (DSARC) milestone reviews[1], the first and foremost question asked by the DSARC of any program manager (PM) is: Can any existing weapon system meet the validated requirement/threat, or can an existing weapon system be modified to meet the requirement/threat (32)? The extremely high costs associated with research, development, and production of new weapon systems, which incorporate new design or technology, are prime contributors to the increasing number of affirmative answers to this key DSARC question. Modifications are no longer an exception to or by-product of new design or new technology weapon system development; they are becoming the rule. Headquarters U.S. Air Force (USAF) has designated Headquarters Air Force Logistics Command (AFLC) as the Office of Primary Responsibility (OPR) for selected

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[1]For this document, the Office of Management and Budget (OMB) Circular A-109 definition of the major DSARC milestones will be used and are: Milestone Zero, Mission Need Identification; Milestone One, Concept Validation; Milestone Two, Full Scale Engineering Development; Milestone Three, Production/Deployment (20 & 23).

major modification (Mod) programs.[2] The cost, complexity, and production duration of these type of modifications dictate special attention (6, 13, 18, 21, 33).

Problem Statement

Modification management and responsibility are the subjects of numerous DOD, USAF, AFSC, and AFLC regulations, directives, manuals, and policy letters. There is no single handbook or pamphlet for the AFLC Program Manager that effectively draws all of the modification documentation together and emphasizes past or potential problem areas or management pitfalls. There is a need for such a document.

Justification

AFR 57-4, Operational Requirements: Modification Program Approval, charges AFLC with the management responsibility of Class IV Modifications and defines a Class IV Mod as:

> A modification that is required to ensure safety of personnel, system, or equipment by eliminating operational, nuclear, or physical hazards (Class IVA), or is necessary to correct a deficiency including one that affects reliability and maintainability (Class IVB), or is required for logistic support purposes (Class IVC) [27:10].

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[2]AFLC was designated by HQ USAF with Program Management Responsibility (PMR) for the B-52D re-wing program, and has PMR for the fabrication and installation of the new wing for the C-5A fleet, the wing re-skinning of the KC-135 tanker fleet, and the stretch and air refueling modifications program on the C-141B (AFR 57-4).

AFR 57-4 goes on to define a Class V Mod as one that ". . . provides a new or improved operational capability or removes an existing capability that is no longer required [27:11]."

AFLCR 57-21, Modification Program Approval, implements the direction of AFR 57-4 and provides AFLC personnel with policies and procedures for documentation and processing of USAF approved modifications. AFLCR/AFSCR 57-3, Class V Modification Management, is a joint command regulation that provides policy, guidance, and procedures, and defines command responsibilities by which AFLC and AFSC activities prepare Class V modification proposals and other documentation prescribed by AFR 57-4. AFLCR 57-12, Class IV Modification Budgetary Requirements, and AFLCM 401-1, Material Program Management Control, provide funding and budgetary requirements for Class IV and V modification management. Most Class IV and selected Class V modifications are managed by a weapon systems manager (SM) at one of the Air Force's five Air Logistics Centers (ALCs) having responsibility for the weapon system being modified. The standard Class IV and V modification is designed and produced in the form of a Time Compliance Technical Order (TCTO) kit. The kit normally contains all the required parts, technical instructions, identification of skill levels required to perform the modification, special tooling, and a concise definition of the installation environment, i.e., base, depot, or contractor facility. Management of these types of modifications is

generally well defined, and to a great degree mechanical. There are certain Class IV and V modifications, however, due to their size, complexity, and cost, which do not fit this TCTO kit "mold." These modification programs more nearly resemble production programs similar to those of new aircraft or missiles developed and produced by Air Force Systems Command (AFSC). The B-52D and C-5A re-wing programs are examples of these "production" modification programs.[3] For these and other large, complex programs, HQ AFLC designates a Program Manager (PM) to manage the modification effort because program management requirements exceed the manpower capabilities of the System Manager's (SM) staff. HQ AFLC will normally authorize the new PM a program office staff, and will usually locate the PM at the ALC having responsibility for the weapon system to be modified. Examples of these Program Offices are the B-52D Re-wing (PACER PLANK) Program Office at Oklahoma City ALC, the C-5A Wing Mod Office at San Antonio ALC, and the C-141B Stretch Office at Warner Robins ALC. The problems begin when the new PM, in close coordination with the SM, must manage a major

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[3]The term "production modification" is used and defined as a continuing process beginning with raw material and ending with a completed end item. All the parts are virtually useless until integrated into the end item. The Lockheed-Georgia Company uses the term "shop to ship" as synonymous with production modification, meaning the aircraft structural parts begin as raw material in the fabrication/processing shop and are never finished work until they are permanently integrated into the structure of the aircraft.

production Class IV or V modification program utilizing regulations, manuals, and policies that are not "production" oriented. He must accomplish this management mission in an environment that is both talent and organizationally oriented and responsive to TCTO kit or maintenance type activity. To avoid having to learn the hard and costly way each time one of these major production Class IV or V modifications is approved by HQ USAF and a new PM is designated and assigned to an ALC by AFLC, there is a need for a single document or pamphlet for the new PM that condenses the important management aspects and requirements of the Department of Defense (DOD) documentation, as they apply to and impact a major production modification effort. This author, throughout this document, will utilize a "lessons learned" approach from past and present major production modification programs, to improve the effectiveness and efficiency of current and future major production Class IV and V modification programs.[4]

Research Objectives

There are three objectives identified with this research study:

1. Identify DOD, USAF, AFLC, and AFSC documentation

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[4]This author further defines a major production Class IV and V modification on page nine, under Scope and Methodology.

that affects the planning and management of major production Class IV and V modification programs.

2. Identify within these documents any known or potential conflicts that may require special management attention by an AFLC Program Manager of a major production Class IV or V modification.

3. Identify, utilizing "lessons learned" from the B-52D/C-5A re-wing and C-141B stretch programs, program management problems, and recommend, where appropriate, to the future Program Manager, possible alternatives.

Research Questions

1. What DOD, USAF, AFLC and AFSC documentation governs or impacts the planning and management of a major Class IV or V modification program?

2. What are the known or potential conflicts within the documentation that the new Class IV or V Program Manager should be made aware of?

3. What are key "lessons learned" from past and current major Class IV modification programs that may be of value to the new Program Manager in the planning and management of a major production Class IV or V modification program.

4. What program management alternatives are available to the new PM?

Literature Review

Major Class IV and all Class V modifications are approved and funded by HQ USAF. Improving a weapon system often requires some research and development (R&D) effort. AFLCR/AFSCR 57-3, Class V Modification Management, outlines management and funding responsibilities for a Mod program in which the R&D effort is managed by AFSC and the installation and support effort is managed by AFLC (2:1). This key regulation, though dated, and the increasing number and cost of Class V modifications, has generated several recent research studies and reports. Because of similarities between some Class IV and V modifications, parts of these reports will be used in this document when they apply to the AFLC PM. Captain Frank Kubecka, in a research study for the Air Command and Staff College titled, "Class V Modifications: Problems in Improving Existing Weapon Systems and Equipment," published in May 1978, identified the problem of defining the fine line in AFR 57-4 that separates Class IV and V modifications; i.e., a modification that meets the definition of a Class IV modification would, in some way, change or improve the operational capability of the subject weapon system (16:1). Kubecka argued for, and supported, that one of the two classes, IV or V, be dropped, and the current documentation that now applies to two classes be condensed into one regulation or directive. He also supported the recommendation that the review, approval, and funding cycles

associated with the modification process be streamlined. Portions of Kubecka's research will be used throughout this study.

Lt Col Reginald Cilvik, USAF, published, in May 1977, an excellent handbook for the AFSC Program Manager titled, "A Guide for the AFSC Program Manager of Less-Than-Major Systems" (12). Cilvik spends considerable time developing the background and process of a Class V modification program from an AFSC perspective, highlighting the necessary coordination and cooperation with the AFLC SM/PM. Some of his findings and recommendations will be used in the development of this guide for the AFLC Class IV and V Program Manager.

Mr. Herbert G. Bryant, USAF, while attending the Defense Systems Management College (DSMC) in May of 1974, published a report titled "The Program Manager in AFLC." In his report, Bryant studies the business aspects of modifying existing weapon systems, placing particular emphasis on the DOD budgeting and planning as it affects overall modification within AFLC (10). He emphasized that item management (IM) support for modification is key. This theme will be investigated and expanded upon in a later chapter. Problem areas with IM and Government Furnished Property (GFP) support for the B-52D and C-5A programs will be used as examples.

In addition to these key publications, Ms. Barbara Klein and Mr. Michael Smigel, Air Force Institute of

Technology, School of Systems and Logistics, Class 79-B, conducted research on the topic of budgetary and contractual influences on modification programs. Parts of their research will be used as it impacts the planning and decision making processes faced by the new Class IV or V Program Manager in AFLC. Data from interviews with Col James R. Wolverton, AFLC C-5A Wing Modification Program Manager and Lt Col Theodore Finley, Deputy Program Manager for Logistics (DPML), Airlift Systems Program Office, Wright-Patterson AFB, OH, are presented to emphasize the real time nature of the management problems facing the PM of a major production Class IV modification. Interviews and data from personnel assigned to and responsible for the program management of the B-52D and C-141B programs are integrated throughout this study to support the research objectives.

Scope and Methodology

The maintenance and modification of in-service weapon systems are both the responsibility and major function of AFLC. For the purpose of this study, the author considers AFLC's management of modifications to be adequate, but less than optimum. Because the System Manager (SM) concept of management is considered adequate for the majority of Class IV and V modifications, this author limits this study effort to those major production Class IV and V modification programs whose:

1. Unit cost for modification is $500,000 or more;

2. Nonrecurring production cost is $5 million or more;

3. Total modification cost is $25 million or more; and/or

4. Production complexity, duration, or political sensitivity causes HQ AFLC to take the modification program out from under SM management and appoint a Program Manager and establish a program office (27).

Chapter II explains the major modification process beginning with the generation of the requirement or need to fix or improve a weapon system, known as a Statement of Operational Need (SON).[5] Following the validation of the SON, I will cover the development of the Budgetary Cost Information (BCI) and the modification proposal and analysis (MPA), then the modification program planning process, followed by modification approval.

In Chapter III, with the modification process as a basis, I review DOD documentation dealing with modifications that have an impact on a new AFLC Program Manager of a major production Class IV or V modification. Throughout Chapter III, inherent conflicts between documents or

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[5]The SON is used by the Major Command (MAJCOM) for planning and programming activities. At the Air Staff the SON may develop into a Mission Element Need Statement (MENS).

constraints on logical program management will be emphasized, and "work around" alternatives are offered where known.

Chapter IV, the key chapter of this study, will bring together "lessons learned" from three major modification programs: the B-52D, C-5A, and C-141B, and selected examples from other programs, and data from Program Managers, both government and contractor. This author considers this chapter key because HQ AFLC has no set policy or procedure established for designating a Program Manager, vice the System Manager, to manage a major production Mod or establishing a separate Program Office to manage a major production effort. In addition, HQ AFLC does not have a single Air Logistics Center (ALC) designated as the "primary" modification center; therefore, there is no single focal point for "corporate knowledge" for major modifications or Program Managers within the AFLC structure (14). Cross flow of "lessons learned," in the past, has been by exception rather than the rule (6). The Acquisition Logistics Division, AFALD/PTQ of AFLC has been charged with gathering and maintaining "lessons learned" data for both acquisition and logistics programs. Because of ALD's recent formation, and the magnitude of the data gathering task, there is presently no summary "lessons learned" for major production modification programs. As of this report's publication date, there is a new automated "lessons learned" system under development. The system and a sample of its data are explained in

Chapter IV. Personnel from AFALD/AQI assisted in gathering and expanding data for the research report.

In Chapter V, utilizing data from former program managers and the lessons from Chapter IV, I will recommend improvements to HQ USAF's and AFLC's Class IV and V management policies and procedures for establishing and operating a program or project office, and recommend further research into a very vital and ever cost increasing major function of AFLC, modification management.

Chapter II

MAJOR MODIFICATION APPROVAL PROCESS

In order to evaluate policies and directives and obtain the maximum benefit from "lessons learned" from past and present Mod programs, it is important for the new program manager to have an understanding of the modification process form its conception through Mod approval and formation of your modification program office.

Statement of Operational Need/Modification Concept Development

The keys to understanding and executing a successful major Mod program are early communications, planning and continual intercommand coordination. If any one of these management fucntions are not actively pursued, by responsbile personnel at all levels within the Defense Department (DOD) chain of command, your modification program may be doomed to dealing with a complex process, lacking clear and complete direction and documentation, and subject to avoidable risk that may make the modification management task difficult if not impossible. Awareness, by the SM/PM, of the early phases of the modification process, coupled with active participation, may provide the catalyst necessary to ensure both the interaction and completeness of these key functions; communications, planning, and intercommand coordination.

The theme and examples in this guide are for modification of fixed-wing aircraft, but the precepts and principles can be applied to the major modification of any weapon system.

The modification process normally begins with the identification of a requirement. The requirement may be to correct a safety or logistical deficiency (Class IV) or to add a new operational capability (Class V) to a weapon system. The requirement may be identified and developed by any or all of the following: implementing, using, or supporting major command, or HQ USAF. In the case of a Class IV Mod, for example correcting a structural deficiency in the wing of a C-5A Galaxy, the requirement was jointly identified and developed by AFSC, the implementing command for the original wing design, Military Airlift Command (MAC), the C-5A's using command, and AFLC, the aircraft's supporting command. In the case of a Class V Mod, such as the addition of air refueling capability to the C-141 Starlifter, MAC is the using command and developed the Statement of Operational Need (SON) based on a HQ USAF directed PMD (22). AFLC is both the implementing and supporting command. Since this program manager's guide is for major modifications as defined in Chapter I, the written modification requirement, IV or V, which evolves as an SON, in accordance with AFR 57-1, may become the basis for the Mission Element Need Statement (MENS) required by DODD 5000.1 and 5000.2. Particulars of both the draft and final requirements are found

in AFR 57-1, Statement of Operational Need, 12 June 1979, as supplemented by HQ AFLC (26:2).

As the requirement is being defined, the first of the key management functions comes into play; communication. Before an SON materializes as a formal document, key players should become involved in the requirement's definition and development. First, and most important, is the person having system responsibility. Since this guide is for the AFLC Program Manager, the system in question has or is in the process of Program Management Responsibility Transfer (PMRT) from AFSC to AFLC. The key person in AFLC is the System Manager in the Material Management Division (MM) at the responsbile Air Logistics Center (ALC) for the subject weapon system. At HQ AFLC, DCS/Logistics Operations, is the System Control Officer (SCO), HQ AFLC/LOA, who functions as the Headquarters liaison/staffer for all matters concerning your weapon system. At each using command headquarters, for example MAC/XPQ for the C-5A, there will be a System Program Monitor (SPM), again as your system's liaison officer. At Headquarters USAF, USAF/RDQ or RDP, your system has a Program Element Monitor (PEM) who works the planning, programming, budgeting, Air Staff coordination, and congressional liaison aspects of your system. By AFR 57-1 direction, HQ USAF Deputy Chief of Staff/Plans and Operations (USAF/XO) is the headquarters focal point for operational concepts, and SON approval, and the eventual processing of your formal MENS.

Early in the Mod concept development process, there may or may not be a Headquarters AFSC formal contact; if so, the individual will be a Systems Officer (SYSTO), normally located within AFSC's Deputy for Systems, AFSC/SD.

By establishing early telephone or informal written correspondence with these key players, an effecitve network for future planning and coordination facilitation is established, and a feedback loop is formed. The latter point, timely feedback, is key, and was identified as a major deficiency in the modification initiation/approval process by a staff study team for the Acquisition Logistics Division, Directorate of Logistics Integration, AFALD/AQI (7 & 8). Lack of an effective communication net, with all players at the same information level, caused different interpretations of the draft concept, extended comment times, caused arbitrary changes in estimated cost and schedules, and generated conflicts with other priority modifications. This caused considerable additional work and loss of valuable program time. All of these problems could have either been eliminated or their program impacts greatly reduced had the modification concept <u>initiator</u> established an early, effective communication network and used it! Figure 1 represents the necessary communications/coordination the Mod concept initiator should accomplish in the formualtion of the draft need/modification concept.

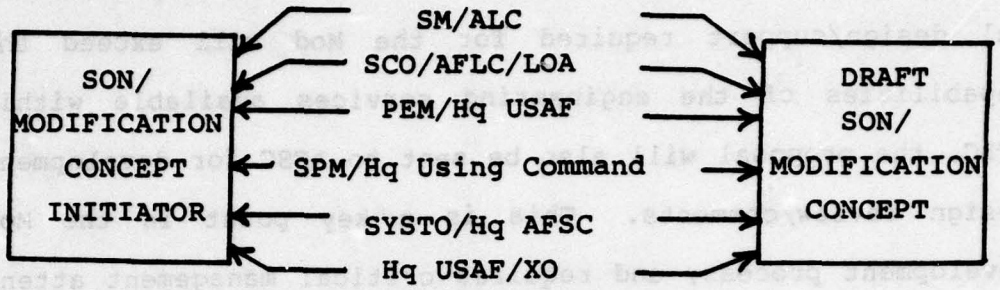

FIGURE 1. DRAFT MOD COORDINATION

SON/Modification Concept Submission

By the time the modification concept surfaces through the formal chain of command within the initiating MAJCOM, and is signed-out by a general officer as a formal draft SON/modification proposal to the Air Staff, in accordance with AFR 57-1, much of the initial planning should have been accomplished. The formal comment/coordination cycle time should be reduced by virtue of the previously mentioned communications network. At the Air Staff the proposal is staffed by the PEM and worked by both USAF/RDQ, Directorate of Operational Requirements, and USAF/RDP, Directorate of Development and Acquisition, depending on the nature of the modification, and briefed to and validated by the Air Staff Requirements Review Group (RRG). Following validation, the Air Staff formally sends the Mod proposal to AFLC for

review/comment. If it is apparent that the degree of technical design/support required for the Mod will exceed the capabilities of the engineering services available within AFLC, the proposal will also be sent to AFSC for development design review/comments. This is a key point in the Mod development process, and requires critical management attention. The SM/PM must evaluate the proposal with respect to the elements of integrated logistics support (ILS); reliability/maintainability (R&M), changes to the weapon system's maintenance concept, new support or test equipment,, new supply support, potential technical data changes, possible change requirements to depot/base facilities, and initially review logistics support resource funds with respect to potential long-lead time procurement requirements. In addition, SM/PM must ensure that the proposed Mod will not conflict with any currently on-going or potential Mods for the subject weapon system. If there is a conflict, the SM/PM should determine if a cost effective work-around plan is feasible. The cost of the work-around plan should be included in the cost estimates for the proposed Mod. Again, information/coordination with the network will reduce the time and increase the accuracy of the proposal review/comments presented to the Air Staff (7 & 8).

On lesser, and primarily Class V, Mods one of AFSC's product divisions, Aeronautical Systems Division (ASD), Electronic Systems Division (ESD), or Space and Missile

Systems Organization (SAMSO), will normally develop cost and schedule estimates for Group B components and request Group A estimates from the AFLC SM in the form of a Budgetary Cost Information (BCI). A study of past Mods indicates poor and/or incomplete estimates, both cost and schedule, evolved out of many of the AFSC/AFLC coordination exercises (7 & 8). Since there most likely will not be any clear division of Group A/Group B in a major production modification, the complexity, and thus susceptibility to error, of the estimation process will increase. It is crutial that the System Manager, if a Program Manager has not yet been appointed by HQ AFLC, understands and coordinates every aspect of the cost/schedule estimation exercise with the AFSC product division. The BCI that surfaces at the Air Staff as a result of this exercise must realistically represent the proposed modification, and again, since there may not be a clear Group A/B distinction, AFLC and the AFSC product division must agree on the modification task description and command responsibility for performance required to produce the proper modification end item. Many past Mods evolved as separate development efforts (AFSC's responsibility) with little concern/coordination with respect to the integration/ installation efforts (AFLC's responsibility) required to successfully complete the Mod. This is a major problem with the current C-5A Wing Mod Program (33); an open, active communication network is the key. AFR 57-4, Modification

Program Approval, identifies the necessary intercommand coordination, but assumes clear GroupA/Group B distinction, and thus, you, the SM/PM, cannot rely on simple regulation compliance for accurate, realistic cost and schedule data. Even though the BCI is a preliminary estimate, by establishing an early, formal and rigorous estimating coordination process between AFLC and AFSC, as changes evolve throughout the life of the modification proposal process, the changes will be known by all, evaluated, and their program impact made available for updating the BCI through the PEM at the Air Staff.

With validation by the Air Staff RRG and the review/comments completed by AFSC/AFLC, the PEM will use the BCI, with revisions, to staff and coordinate the proposal within HQ USAF/RDQ/RDP. AFR 57-1, Atch 9, 10, and 11, have excellent, detailed time-flowed diagrams for the SON/MENS process. When it is determined that the modification proposal is complete and the need successfully justified to compete for funds and resources, in accordance with AFR 57-4 procedures, the PEM will coordinate an Air Staff sign-out of a Program Management Directive (PMD) to HQ AFLC/LO, DCS/Logistics Operations, requiring a detailed Modification Proposal Analysis (MPA) for a Class V Mod or a Configuration Control Board Item Record (CCB IR), Form 48, for a Class IV Mod in accordance with AFLCR 57-21. The PMD requirements are flowed down from HQ AFLC to the appropriate SM at the

responsible ALC in the form of a Program Active Directive (PAD). In addition, HQ AFLC/LOA will assign the modification proposal a Class IV or V [6] modification number. HQ AFLC should make the determination, at this time, if the program will be managed by the weapon system's SM or if there is justification for the appointment of a PM and the establishment of a program office.

Management complexity, and reporting requirements may increase as a result of the BCI estimate. If the Mod estimate will require $75M in research, development, test and evaluation (RDT&E) and/or $300M in production costs, or the Mod is of particular interest to the Secretary of Defense (SecDef) then the management requirements of Office of Management and Budget (OMB) Circular A109, DODD 5000.1, DODD 5000.2, and AFR 57-1 apply, even though your program is a Mod, and not a new acquisition (31). In order to complete the Mod concept submission process, it is assumed that your Mod does not, at this time, exceed these cost criterion, but as per Chapter I criterion, does exceed $5M and thus requires HQ USAF approval and funding (3).

The MPA and CCB IR are a detailed expansion of the basic BCI data, and requirements/format are covered by

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[6]AFR 57-4 stipulates that all Class V Mods will be approved and funded by HQ USAF; thus the actual Mod number for a Class V will flow down to HQ AFLC/LO from the Air Staff.

AFLCR/AFSCR 57-3, AFLCR 57-12, and AFLCR 57-21. Again, if development effort/support is required from an AFSC product division, rigorous coordination is a must. Cost and schedule revisions must be realistic, not optimistic; optimism may be directed by the Air Staff, but it should not be requested or encouraged.

You, the SM/PM will have to present and defend your modification proposal to your ALC Configuration Control Board (CCB) in accordance with AFLCR 57-21, Modification Program Approval. The ALC CCB process allows for, and thus you should take advantage of, the opportunity to bring before the CCB technical/functional personnel from other Department of Defense (DOD) agencies to support and defend the data in your MPA/CCB IR (3:4, 6). By utilizing expertise from the using command, AFSC, and Air Training Command (ATC), one should be able to assure that the proposal package to go forward to HQ AFLC reflects as realistic and coordinated a program as possible. The CCB exercise is repeated again at HQ AFLC. Following AFLC CCB approval, the Mod package with the MPA/CCB IR is forwarded to the Air Staff, and becomes the data base for competition for resources, funds, and the ultimate approval/disapproval of your Mod. Figure 2 flows the draft SON/Mod concept through the AFLC/AFSC review/comment, costing development, and the formal AFLC CCB process.

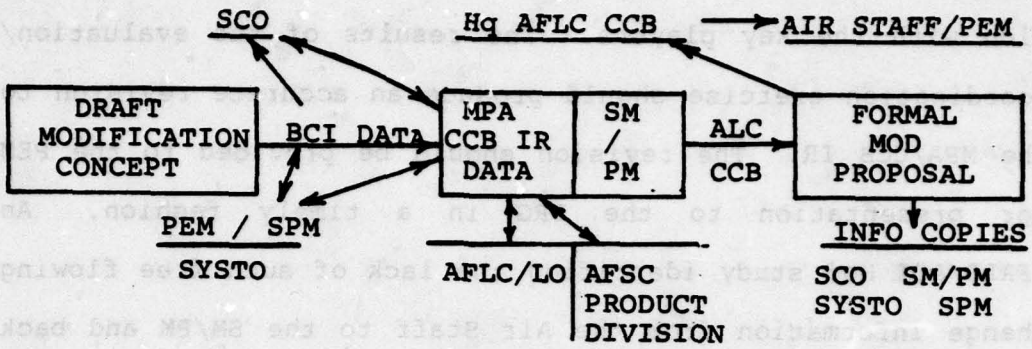


FIGURE 2. MOD PROPOSAL SUBMISSION

SON/Modification Concept Approval

At the Air Staff the PEM, assisted by project officers from RDQ/RDP as required, will staff the formal proposal (MPA/CCB IR). The PEM will be responsible for briefing your mod to the Priority Review Group (PRG), chaired by HQ USAF/XOO (7:15). The group, with representatives from all MAJCOMs, rank orders all pending and approved modifications, and publishes the USAF modification priority list. Because of the extensive use of your key player's communication/coordination network during the modification concept definition and BCI/MPA development, proper suport for your Mod should be present among the members of the PRG. The feedback communication net once again becomes very important at this point in the mod approval process. During the priority evaluation, the PRG may want to alter either the schedule presented in the MPA/CCB IR, or the total number of units to be modified in order to "fit" your Mod in the overall USAF modification plan. It is imperative that

changes flow back to the SM/PM for evaluation and coordination with the key players. The results of the evaluation/coordination exercise should produce an accurate revision to the MPA/CCB IR. The revision should be provided to the PEM for presentation to the PRG in a timely fashion. An AFALD/AQI Mod study identified the lack of such free flowing change information from the Air Staff to the SM/PM and back caused negative impact to numerous programs. The Air Staff project officers took excessive time to coordinate changes, effect Mod approval, and issue PMDs. In addition, revised data for the MPA/CCB IR were sometimes not included in the final decision packages:

Modification 2787A, F-4 "Pave Spike" Mod:

MPA submitted to Air Staff - Jan 1974

PMD issued by Air Staff - Oct 1975

	MPA		PMD		DELTA	
	Qty	Dollars	Qty	Dollars	Qty	$M
FY 74	91	$21M	91	$20M	0	-1
FY 75	120	$17M	85	$14M	-45	-3
FY 76	0	$ 9M	45	$ 5M	+55	-4
Total	211	$47M	221	$39M	+10	-8M

(7:24)

This example is for a TCTO "kit" type modification. Though the changes caused program problems, cost and schedule recovery were possible by kit buy manipulation. In a major production modification program, production rates cannot be arbitrarily changed without adverse cost and schedule

impacts. One does not start and stop a process assembly operation without perturbating both the labor force and material factors, which directly relate to program costs. Therefore, the SM/PM must evaluate and make these impacts known to the Air Staff in order to minimize the likelihood of receiving a PMD that you cannot live with or manage; communicate, plan, and coordinate!

When your Mod is approved out of the PRG with a priority, it is further staffed and briefed to the Directorate of Logistics Plans and Programs, USAF/LEX, who chairs the Budget Program 1100 Review Group. Major modifications are budgeted against and funded by BP1100 funds. Funding is a separate subject in Chapter III. It is the BP1100 Review Group's responsibility, in conjunction with the Air Staff Budget Program Review Committee (BPRC), to get the USAF's Mod priority list into the Planning, Programming, and Budgeting System (PPBS) via the Program Memorandum Objective (POM), and thus funded. Due to political and fiscal reality, the basic MPA/CCB IR data may again be changed to "force fit" your Mod into the overall USAF POM. It is imperative that these changes flow back to you, be evaluated, and the impact again forwarded up through the chain of command in order to be accurately reflected in your Mod's pending PMD. Assuming your Mod clears the financial side of the Air Staff, your PEM, in conjunction with a project officer from USAF/LEX/LEY will use the amended MPA/CCB IR to draft your

modification PMD. The PMD, coupled with both a Procurement Authorization (PA) from USAF/LEX and a Budget Authorization (BA) from USAF/ACB, issued to HQ AFLC, constitutes authority to activate and spend money on your modification program. Figure 3 shows the approval/revision process. AFR 57-1, Atch 9 and 10 further details the process.

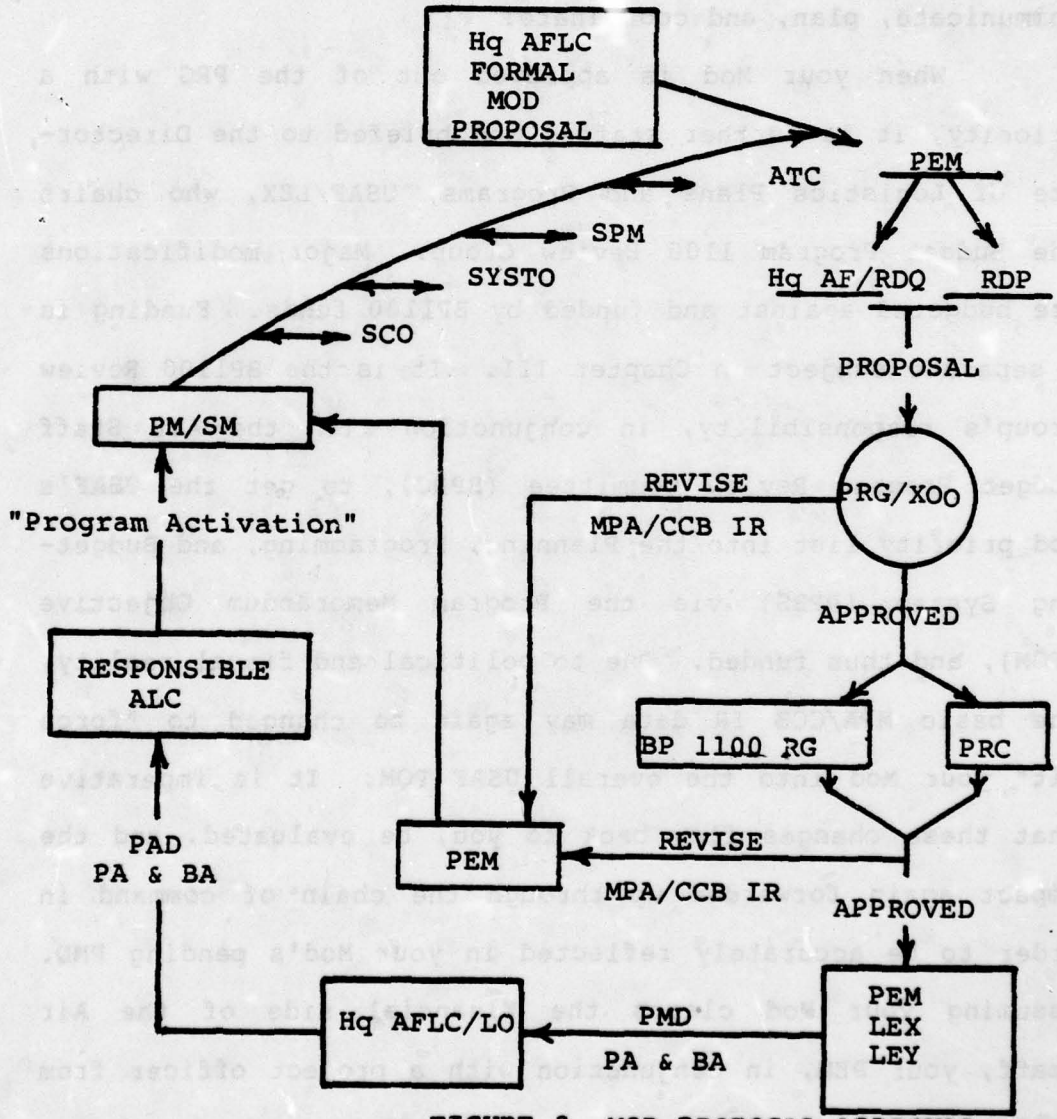


FIGURE 3. MOD PROPOSAL APPROVAL

Because your modification is a continuous process production rather than a kitable Group A/Group B TCTO type modification, the sequence of events from Mod approval on will be different from the normal TCTO process which is basically engineering design, trial kit installation, second article kit proof and modification production/fleet installation. The nature of your modification is different and though your program may include a prototype modification aircraft, the management approach required to complete your program will differ from the somewhat mechanical "kit" Mod programs. Chapter III covers pertinent regulations and policies that you must conform with or seek relief from. Regulations and policies can be interpreted and modified to get the job done, but one system that cannot be by-passed and can grind your program to a halt is the personnel system. Identifying and manning your program office should start as soon as HQ AFLC makes the decision to manage your modification program outside of, or co-located with, the System Manager's organization. The following table represents a basic AFLC program office staff. The number of people and their job classifications will have to be justified and molded to fit your particular modification program:

Job Title	Number Assigned	Job Title	Number Assigned
Program Manager	1	Configuration Control Specialist	1
Deputy PM	1	Program/Tech Data Specialist	1
Secretary	4	Item Management Specialist	1
Funds Specialist	1	Procurement Officer	1
Industrial Engineer	2	Negotiator/Buyer	1
Technical Engineer	2		
Quality Engineer	1		
Reliability & Maintainability Eng	1		

The program office positions may be staffed by either civilian or military. Key program positions; PM, Deputy PM, Procurement Officer (PCO), Quality Engineer, and Negotiator/Buyer, should be filled by personnel whose assignment longevity can be assured in order to provide the program with a "corporate knowledge" base. This key point will be expanded in Chapter IV.

Chapter III

DOD MODIFICATION DOCUMENTATION

In order for the new AFLC PM to obtain, and both effectively and efficiently manage resources throughout the duration of a major modification program, an awareness and understanding of both Class IV & V Mod directives and policies are necessary. This chapter of the guide is not intended to be a "cookbook," and because of the inherently dynamic nature of directives and policies, it may not be all inclusive. The documents identified are key ones. The PM must assess the magnitude, duration, and anticipated complexity of the subject Mod, and tailor use of the directives and policies accordingly. The following is a list of primary directives, regulations, manuals, and pamphlets pertinent to Class IV & V major production modfications:

Office of Management and Budget (OMB) Circular A-109 Major System Acquisition, 5 April 1976.

OMB Circular A-109 Pamphlet. Major System Acquisition: Application of OMB Circular A-109, October 1976.

Defense Acquisition Regulation (DAR).

DODD 5000.1 Major System Acquisition, 18 January 1977.

DODD 5000.2 Major System Acquisition Process, 18 January 1977.

DODD 7200.4 Full Funding of DOD Procurement Programs, 30 October 1979.

AFR 27-8 Systems and Equipment Modernization/Maintenance, 6 May 1977.

AFR 57-1 Statement of Operational Need (SON), 12 June 1979.

AFR 52-4 Modification Program Approval, 15 December 1977.

AFR 65-3 Configuration Management, C1, 1 September 1974.

AFR 172-14 Full Funding of AF Procurement Programs, 6 July 1978.

AFR 800-2 Acquisition Program Management, Sup 1, 14 July 1978.

AFR 800-8 Integrated Logistics Support for Systems and Equipment (under revision/rewrite).

AFR 800-14 Management of Computer Resources, Sup 1, C1, 31 March 1977.

AFLCR/AFSCR 57-3 Class V Modification Management, 30 December 1970.

AFLCR 27-1 Modification Program Data, C1, 26 April 1976.

AFLCR 57-12 Class IV Modification Budgeting Requirements, 21 December 1977.

AFLCR 57-21 Modification Program Approval, 2 April 1979.

AFLCR 66-21 Systems and Equipment Modification Maintenance Program (G079), 3 May 1979.

AFLCR 80-4 Test and Evaluation (under revision/rewrite).

AFM 172-1 Budget Operations, 3 July 1972.

AFP 172-4 The Air Force Budget, March 1978.

AFP 800-7 Integrated Logistics Support Implementation Guide for Systems and Equipment (under revision/rewrite.

AFSCP 800-3 A Guide for Program Management, 9 April 1976.

AFSCP 800-21 A guide for Program Managers: Implementing Integrated Logistics Support (under revision/rewrite).

T.O.-00-5-15 Air Force Time Compliance Technical Order System (TCTO), 30 November 1978.

A brief condensation/summary of these directives and policies may be found in Appendix D of the Air Force Institute of Technology (AFIT) Thesis LSSR 16-79B by Klein and Smigel. This program manager's guide will identify and comment on, from a program manager's prospective, some of the key documents from the above list.

Financial

One can be the most innovative and aggressive program manager in AFLC but if you do not have the right "gold" your management tasks, and thus your program, will be handicapped.

By gold I mean financial resources. Financial resources themselves may not smooth the management path unless those resources are the right kind of funds, at the right time, and in the right amount. Air Force Pamphlet 172-4, The Air Force Budget is an annual publication, and explains in layman terms the DOD Planning, Programming, and Budgeting System (PPBS) and Resource Management System (RMS). Every PM should have, and understand this pamphlet. The theme and message of AFP 172-4 is planning and lead time away requirements to get your funding into the Air Force POM. This author, based on my program management experience, recommends that you obtain and become familiar with AFP 172-4 prior to attempting to manage utilizing the guidance/policies of DODD 7200.4, AFR 172-14 and AFM 172-1.

At the root of the financial problems in major modification is DOD's response to Congressional concerns about Mod funding. During the FY73, and again in FY78, House of Congress Appropriations proceeding,[7] Congressional personnel expressed concern that some DOD agencies, primarily the Navy, were funding labor and overhaul work out of procurement funds (P1100), which were appropriated for specific programs, instead of funding them from Operations and Maintenance (O&M) funds (3400). In response to these concerns, AF

[7]For further details, see House Appropriations Committee Reports 92-1389 and 95-451 (15).

funding policy is to fund any Mod RDT&E with 3600 funds, buy "kit" hardware with Mod procurement funds (P1100) and pay for the installation labor, depot or contractor, and expense material with O&M funds (3400). RDT&E (3600) funds have a two year obligatory life, P1100 a three year, but O&M (3400) funds expire annually. Under the full funding directions of DODD 7200.4, funding will be based on estimated total program cost, with some exceptions for long-lead time components/ material, that will insure delivery of a given quantity of usable end items. Therefore, under current AF and OSD policy, you cannot buy kits in FY79 and fund installation in FY80 because you have not produced a usable end item in FY79. In addition, since O&M (3400) will expire the last day of FY79, you may only buy the number of kits (P1100) for which you can complete installation by 30 September. It does not take any higher order math to see that a PMs financial flexibility has been reduced to annual, whole integer Mod unit buys. This may be an acceptable, though less than optimum, way to do business if your "kit" fits the nice, neat integer mold. Your major production Mod does not fit the integer mold. It is a multi-station production process flow that does not "turn on/off" on an annual basis. AFM 172-1 (C2) has the following provisions:

> "d. Modernization of major end items or equipment, where the scope of work to extend service life, upgrade or change equipment capability is so great as to constitute a capital investment and a substitute for new procurement, is considered an

investment cost to include labor and expense material. [3:8.d]" (Underlining added by author.)

This paragraph recognizes that limited, specific Mod programs fit the major system acquisition mold, and thus should be afforded the same financial management flexibility enjoyed by a major system acquisition program. The B-52D re-wing extended the service life of that aircraft. The C-5A re-wing will extend the service life of that aircraft into the twenty-first century and negate, for a period of time, the need for a new, strategic outsized cargo airlifter. The stretch and air refueling Mod to the C-141A has greatly improved the airlift capability and deployment flexibility of that aircraft. The B-52G/H Offensive Avionics/Air Launched Cruise Missile (ALCM) Mods are being accomplished as a "substitute for new procurement," the B-1. All of the above Mods were or are major production modifications and meet the definition of the above AFM 172-1 paragraph, but none were or are presently funded, other than the RDT&E phases, as "investment cost to include labor and expense material" type programs. At the time of publication of this guide, there was a move afoot at the Air Staff, USAF/ACB, to coordinate with the various House and Senate Appropriations Committees a policy interpretation for major Mods that would allow OSD to change its funding policies along the lines of AFM 172-1, 8-3d (15). The concern at both OSD and Congress is that visibility and tracking of new procurements versus

modification of existing weapon systems may be lost. A solution would be to continue to fund new procurements with P1000, but to fully fund major Mods with P1100 funds. These Mod funds could and should be identified for obligation only by the specific Mod program element in order to provide the desired visibility and tracking. The YC-141B stretch/air refueling prototype program was funded with P1100 funds, and the program was successfully completed ahead of schedule, one month, and under budget, $4M (5). If your Mod can be justified as a capital investment, every effort, early in the PPBS cycle, should be expended to get your Mod staffed/ briefed through Air Staff to OSD to be programmed and budgeted as a P1000 or P1100 funded program.

AFR 172-14 has provisions for funding exceptions for long-lead material/component problems you may be faced with. Again, early recognition and proper staffing of these problems is required in order to "fit" your resource needs into the Air Force Program. The POM cycle and funding are the heart of your program, ignore it and the health of your program will be in jeopardy.

Program Management

> "Successful acquisition depends upon competent people with appropriate authority, realistic objectives, appreciation and reduction of risk, candid communication, motivation, contractor management flexibility and recognition that all programs are different [25]. (Underlining added by author.)

This quote is from testimony by S. N. McDonnell before the Office of Federal Procurement Policy (OFPP) in their pre-A-109 publication hearings. The essence of Mr. McDonnell's position was incorporated in A-109. A-109 set high level policy guidance for the acquisition of major systems for all federal agencies. A-109's theme can essentially be summed in four management and three business principles:

Management:

1. For important programs, appoint and give both authority and responsibility to a Program Manager;

2. Plan ahead, look for alternatives;

3. Use a high level decision-making review system; and

4. Encourage and foster new ideas.

Business:

1. Create and maintain competition;

2. Be conscious of unnecessarily extending program duration, i.e., time is money; and

3. You are going to pay for what you get, do not expect anything free.

DODD 5000.1 and 5000.2 implement, for the Defense Department, the intent of A-109. Again, these directives are high level policy messages. 5000.1 recognizes the importance of the PM, and the need to extend to him management flexibility. 5000.1 also emphasizes the need to

consider logistical support considerations during an acquisition program, and defines the milestone concept for program review/approval. 5000.2 further defines the acquisition policy/process and contains a key sentence in section two: "The management of system programs not designated a major system acquisition will be guided by the provisions of the Directive [32:II]." (Underlining added by author.) This sentence indicates that if your management plan can comply with the intent of A-109, 5000.1 and 5000.2, proper support for your program should flow from AF and DOD. 5000.2 goes on to say,

> The DOD Component (meaning in this case the implementing Command, AFLC) shall support the establishment of the strong system program office. Because of the demanding nature of the program management task, all levels of authority in the DOD shall ensure that the program manager is not diverted from his primary goal by unnecessary reports, reviews and briefings [32:I].

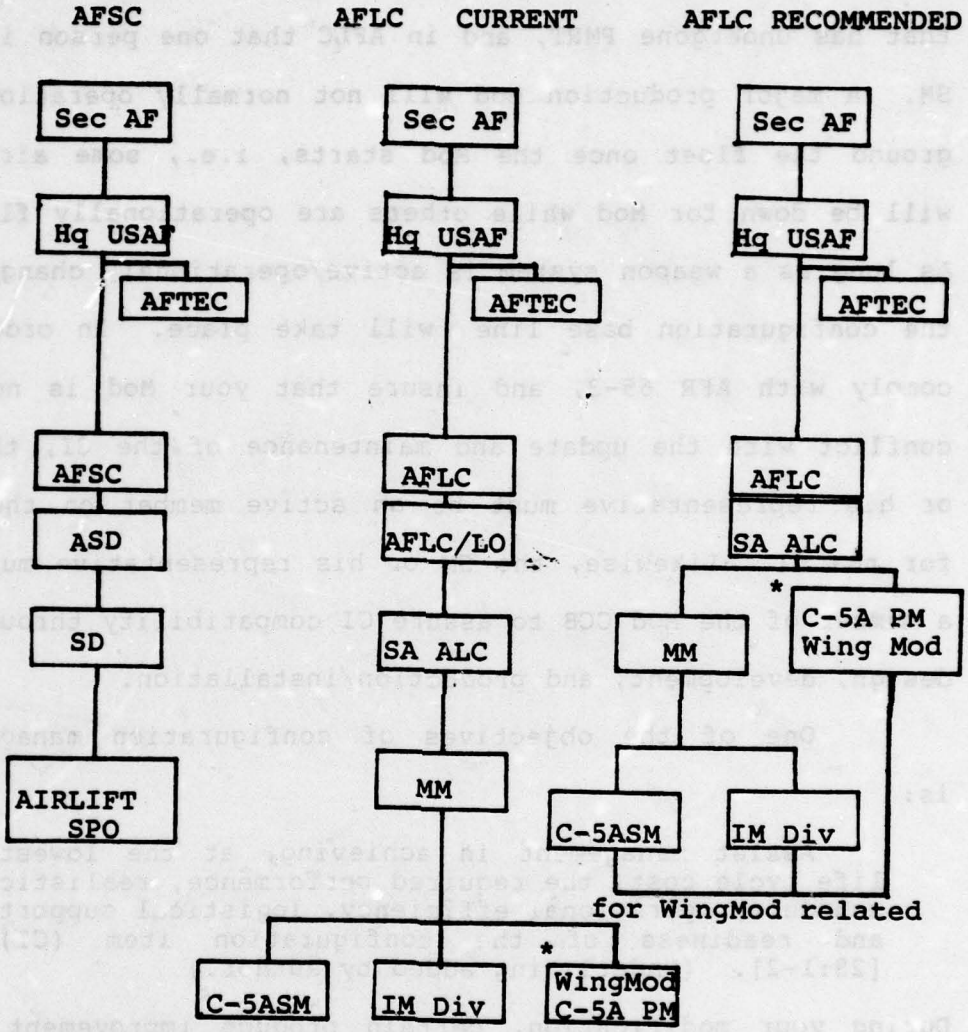
Compliance by AFLC with this direction dictates that you, the PM, will have an organizational reporting structure different from, and more visable and responsive than the traditional SM organization. Whatever the structure developed, it must include a direct line of both communication and responsibility through the SM and to all affected Item Managers (IM). The communication/responsibility issue is expanded in Chapter IV.

AFR 800-2 is the AF's implementing regulation for A-109, DODD 5000.1 and 5000.2. 800-2 recognizes and

reenforces that "each acquisition program will be managed by a single person known as the program manager who will be delegated authority and responsibility for the acquisition program [29:1]." Paragraph five of 800-2 details your Program Management responsibilities, and paragraph eight emphasizes the importance of necessary lines of communication. There are no direct conflicts in AFR 800-2 for the AFLC PM, but the tone of the regulation assumes AFSC System Program Office (SPO) structure and management. Changes in authority, responsibility, manning, organizational structure, and line of reporting within AFLC would be required in order to comply fully with the intent of AFR 800-2. Figure four depicts the current line of authority, responsibility and communication for the AFSC/ASD's Airlift SPO which has responsibility for the design and test for the new wing for the C-5A. Also depicted is the current AFLC organizational structure, and this author's recommendation for an organizational structure to meet the intent of 5000.1, 5000.2 and AFR 800-2.

The recommended structure should include "blue line" or direct communication authority by the PM, to any senior element in the chain of command to resolve program problems in a timely fashion. This situation existed on the YC-141B prototype program, and proved to be both effective and efficient.

AFR 64-3, Configuration Management states that one



SA ALC - San Antonio Air Logistics Center
AFTEC - Air Force Test Evaluation Center
IM - Item Management Division MM - Material Management

FIGURE 4. AFLC ORGANIZATIONS

*Currently the AFLC PM for the C-5A wing Mod is co-located in the Airlift SPO, and the Deputy PM is located at SA-ALC.

person shall have configuration responsibility for a system that has undergone PMRT, and in AFLC that one person is the SM. A major production Mod will not normally operationally ground the fleet once the Mod starts, i.e., some aircraft will be down for Mod while others are operationally flying. As long as a weapon system is active/operational, changes to the configuration base line will take place. In order to comply with AFR 65-3, and insure that your Mod is not in conflict with the update and maintenance of the CI, the PM or his representative must be an active member on the CCB for the CI. Likewise, the SM or his representative must be a member of the Mod CCB to assure CI compatibility throughout design, development, and production/installation.

One of the objectives of configuration management is:

> Assist management in achieving, at the lowest life cycle cost, the required performance, realistic schedule, operational efficiency, logistical support and readiness of the configuration item (CI) [28:1-2]. (Underlining added by author.)

During your modification, certain product improvement programs (PIP) and engineering change proposals (ECPs) that could not be cost justified by themselves because they would require an aircraft be downed and torn apart to accomplish, will become cost effective because your Mod will be responsible for downing and dismantling portions of the aircraft to accomplish the major Mod. Close cooperation and team-like effort is required by the functional members of the PM's and

SM's staff to get the right PIPs and ECPs approved and funded, and on to the aircraft, without adversely impacting the cost and schedule of the major Mod. Problems in this area are expanded in Chapter IV.

AFR 57-4, Modification Program Approval, requires that you

> install Mods on the most economical schedule . . . if the PMD directs a completion date that is not economically feasible, the MPA must so state and reflect an economical schedule [27:1].

Funding and schedule flexibility is needed to meet this requirement. Potential conflict exists unless the earlier identified and proper funding is programmed, and the PM is in fact given management flexibility by AFLC; related C-5A and B-52D wing Mod problem examples are in Chapter IV. AFR 57-4 details responsibilities by Major Command. The responsibilities are directed by HQ USAF PMDs. Cilvik sums up the importance of 57-4:

> The modification manager is charged . . . to consider the total scope of a Class V (or IV) modification program, which includes production, installation, support elements, training, and facilities. It is therefore important that the PM seek early determination of the appropriate major command to be assigned modification management responsibility . . . Class V (and IV) modification would normally be directed to AFLC for management with the AFSC program management office (PMO) acting in a support role. The mutual acceptance of Mod responsibilities by both the Program Manager (AFSC) and the Modification Manager (AFLC PM) should be established during RDT&E and the early planning stages of the Class V (or IV) modification to preclude misunderstanding of respective roles in the accomplishments of the modification program

[12:8]. (Parenthesis and underlining added by author.)

AFLCR 57-21, Modification Program Approval, specifies policies and procedures for the documentation, processing, and approval of modification requirements following transfer of program management responsibility (PMR) from AFSC to AFLC (per AFR 800-4, AFLC/AFSC Sup 1), and implements AFR 57-4. AFLCR 57-21 outlines AFLC responsibilities in support of AFSC managed updating changes/Class V Mods before PMRT (3:1). The key chapters of 57-21 are Chapter Four, Processing Class IV Mods, and Chapter Five, Processing Class V Mods. The conflict in 57-21 is that it assumes and is written as if every Class IV & V Mod fits the Group A/B TCTO kit mold, and thus 57-21 tends to be a mechanical, by the numbers directive for SM and the IM system support activities, and not written for an acquisition program. The format and explanations in Attachments 1 and 2 of 57-21, Preparation of the Form 48 CCB IR, and Form 934 Class IV Modification Schedule are excellent and provide a good foundation for a program management plan (PMP). Coordination through and flexibility by the ALC Chain-of-Command and HQ AFLC/LOAP will be required to fit your Mod into the intent of the AFLCR 57-21. Exceptions to T.O.-00-5-15, required by 57-21, may be required with respect to the trial kitting and proofing of your Mod. The "Final Approval Authority for Class IV Mods," Figure 6-1 of AFLCR 57-21

dramatically illustrates the unnecessary management layering, which extends coordination time, and thus program time. Figure 6-1 of 57-21 is included here as Figure 5. If an AFSC SPO director were constrained by a similar approval authority matrix, very few programs would ever be on schedule or on cost. The PAD that is issued by HQ AFLC to SM/PM as a result of the HQ USAF PMD must cut through Figure 6-1 of 57-21 and must allow the PM to make decisions and manage. AFSC does not manage billion dollar programs a nickle at a time, AFLC should not either.

AFLCR/AFSCR 57-3, Class V Modification Management, is an out-dated but not rescinded joint command regulation specifically for Class V Mods. HQ AFLC/LOAP, as AFLC OPR for the regulation, has tried on numerous occasions to revise 57-3 and has met with unspecified resistance from AFSC. The new AFLCR 57-21 now incorporates Class V policy and procedures and AFLC/LOAP considers 57-21 as the guiding regulation for Class V Mods (14).

In the various "lessons learned" sections of Chapter IV references to documentation are made and examples are provided where conflict with program management exists. AFSCP 800-3, A Guide for Program Management, though an AFSC document, is an excellent program management guide, and will provide the new AFLC PM with many of the management tools and insights needed for his program. If your major Mod is a Class V, the Cilvik, Kubecka and AFALD AQI studies listed in

TYPE ACTION	SM/IM DIVISION	ALC CCB	HQ AFLC CCB	USAF HQ
Class IV modifications to aircraft, missiles, their related trainers, SE and airborne equipment.		$500,000	$5,000,000	Over $5,000,000
Class IV modifications to ground systems and equipment, and their related trainers and SE.		$100,000	$ 500,000	Over $ 500,000
Cost increases or additional requirements to Class IV modifications. (Note 1)	$5,000	$100,000	Note 2	Note 3
Schedule slippages.	Less than one quarter	More than one quarter		

FIGURE 5. FINAL APPROVAL AUTHORITY MATRIX

NOTES:

1. These figures are cumulative. Additional requirements for increased quantities to be modified, not the result of changes in attrition factors, will be approved by the original approval authority.

2. All increases to AFLC approved modifications exceeding $100,000, increases to HQ USAF approved modifications exceeding $100,000 but less than $200,000 or 20% of the total approved cost.

3. All increases to HQ USAF approved modifications exceeding $200,000 or 20% of the total approved cost.

this bibliography will provide additional assistance to you and your staff.

Chapter IV

LESSONS LEARNED

Up to this point in the guide, no mention has been made of the other partner in a successful major production modification, the contractor. This exclusion is intentional. It is important that the Government half of the modification team be unified, knowledgeable, aggressive, and to borrow an Air Force Contract Management Division (AFCMD) expression, "present one face to industry." This chapter is divided into four major sections; communications, pre-contract award, contract execution, and anticipated problem areas. In each section, lessons learned and management philosophy from several major production Mods are presented. In order to present a balanced view, and yet not distort any examples or comments by establishing an adversary tone, many of the examples and management philosophies are presented on a nonattribution basis. By honoring nonattribution, this author was able to secure candid and complete program management information from program managers in the Air Force and on the management teams from two major aerospace firms. The aircraft industry at large, especially Lockheed and Boeing, are appreciative and sensitive to the unique problems facing the AFLC PM in the management of a major production Mod, and are serious in their interest to assist in streamlining and

increasing the efficiency and effectiveness of present and future Mod programs. Their candid inputs to this guide strengthen the guide and drive home the importance of industry and government fucntioning as a team in the accomplishment of the task at hand, a major production modification.

Again, because of the dynamic nature of "lessons learned," this guide does not pretend to be all inclusive. The thrust of this chapter is in the recognition of and correction of management versus technical problems of program management. Many technical "lessons learned" on acquisition, modification, and logistical support programs are now available through a new automated "lessons learned" data system developed by the Product Performance Division, Air Force Acquisition Logistics Division, AFALD/PTQ. The new system, scheduled to be completely operational in September of 1979, is located at AFALD, Area B, Bldg No. 52, Wright-Patterson AFB, OH (WPAFB, OH). Because of the candid, factual nature of these "lessons learned," both government and contractor, the data is considered sensitive and at this time, there are no plans to put remote access terminals at the various ALCs for your use. By HQ AFLC direction, all Form 48 (Class IV) and MPA (Class V) proposals are now sent through AFALD/PTQ for review, and you will receive formal written notification of any pertinent lessons learned about your upcoming Mod. Recent updates to old and issuance of new regulations and directives (AFALDR 800-2, AFLCR 800-13,

and AFR 80-11) will increase the lessons learned data bank because formal feedback loops and the reporting of lessons is now required by all major programs and by all ALC activities. Because the AFALD/PTQ System is based on key words/terminology indexing, you or one of your representatives may want to plan an official visit to WPAFB to investigate and expand further the potential of this system, and its ability to assist your program. In addition, AFALD/PTQ may identify your Mod for special interest and tracking, and request periodic "lessons learned" from your program (11). A sample of the key words and data from the new system may be found in Appendix B.

Communications

The theme of early, accurate, and complete communications presented in Chapter II for Mod concept development continues into detail program planning. Of all program management personnel contacted, both military and industry, the most important lessons learned is the absolute necessity to establish effective communications between and within all agencies participating in a given program. Many of the following points are not unique to modification programs, but if not considered, will definitely compound an already complex management task.

Leadership. There can be one and only one leader in a major Mod program, and that has to be the PM. It is his

responsibility to promote among all Air Force, as well as contractor, personnel assigned to or associated with the program a team attitude that transcends all parochial, functional attitudes that have a tendency to evolve throughout the life of a program. The focus of the team attitude should be to produce the best weapon system modification consistent with least cost and schedule constraints. Proper motivation and attitude, AF and contractor, will engender open and prompt exchange of information. Failure by the PM to establish a proper program tone/attitude allows adversary attitudes to develop which will stifle the communications necessary for effective and efficient program management. The importance of establishing AF/contractor harmony must be approached with educated caution. The contractor is there to do a professional job for which he can expect to be paid a fair price that should include a reasonable opportunity to earn a profit. The AFLC PM, if not cautious, can become more interested and involved in "good relations" than in holding the contractor to doing what he is paid to do, his job. The bottom line is that information flow must be truthful, open, frank, and that respect, AF and contractor, must be mutual and earned. If this situation exists, the team attitude will flow, as will the success of your program.

The AFLC PM's leadership role can be enhanced by support from HQ AFLC. HQ AFLC should request and coordinate initial PMD direction from HQ USAF that identifies a single

line of responsibility that will bridge the problem gap in a joint command, AFSC/AFLC, major Mod program. A possible alternative that would provide this suggested single line of authority is:

AFLC PM/SM manage development by subcontracting engineering development to an AFSC/SPO.

AFLC PM/SM manage integration by subcontracting, if necessary, for AFSC/SPO to manage hardware procurement.

AFLC PM/SM manage installation (7 & 8).

If this management responsibility structure can be established and directed early, one has a single manager to reconcile the difference which will arise between the developer (AFSC) and the implementor (AFLC). This management responsibility structure fits and can best be supported by the organizational structure recommended in Chapter III. Brig Gen Donald P. Litke, former AFLC PM of the C-141B stretch/air refueling Mod program, supports the single manager, single line of authority with direct lines of communication up to and through the Air Staff approach, which proved very successful on his program (18).

The need for a single manager, single integrator approach is supported by an example dealing with the KC-135 tanker. This aircraft is presently not under single management, and faces many cost and schedule problems over the next few years. All of the following programs are partially or fully funded, and are at various stages of development or

production; re-skinning the underwing surfaces, addition of drag-reducing wing tip "winglets," upgrading the aircraft's avionics, and replacing the current engines with new fuel efficient turbofan engines. Re-skinning is managed by Oklahoma City ALC, winglets by the AF Aerodynamics Lab, avionics by the AF Avionics Lab, and re-engining by AFSC/ASD's Airlift SPO. Each has a cost and schedule impact on the other, and there are structural design consideration/ conflicts between the re-engining and winglets programs which may require removal once again of underwing skin panels. There is currently no planned single manager for integration of these existing or potential programs, and yet each program does affect the other (33). Were there a single manager for integration and installation, subcontracting for the various developments and procurement as necessary, a workable cost/schedule could be developed, instead of the current conflicting schedules.

Strategy. Depending on the technical complexity and amount of testing required to verify your modification design, different functional disciplines will be required at different points of time throughout the life of your program. It is imperative that the PM have all Air Force and contractor disciplines brougnt on board initially so that the program structure and goals are clearly understood and accepted by all. This includes all AF support (user, AFLC, AFCMD, ATC, AFSC) and test (AF Flight Test Center, AF Test

Evaluation Center) agencies as well as contractor personnel from planning, tooling, manufacturing, and especially quality assurance. Once all functional disciplines, support, and test agencies are on board, the AFLC PM must insure all know and understand that by the Defense Acquisition Regulation (DAR), direction to the contractor is by written correspondence from the Procurement Contracting Officer (PCO) or the Administrative Contracting Officer (ACO) only. Any guidance or interpretations by other individuals or agencies must flow through the PM for his determination as to program impact or necessity and direction to act by the PCO/ACO. Failure to operate in this mode can result in conflicting guidance to the contractor and deter orderly progress on the program. Industry has indicated that the situation of two major commands (AFSC/AFLC) sharing responsibility and authority, and thus guidance, on a single program "is particularly troublesome" (21). This same theme pertains to dealings with subcontractors. Subcontractors can make or break your program, and deserve your and your staff's interest and management surveillance, but their direction and guidance are the responsibility of your prime contractor. The prime is paid for his subcontract management, holding the prime's "feet to the fire" is the proper and legal management approach, not providing guidance or direction directly to the sub.

The final area for consideration under strategy that

requires early communication and coordination is a determination of degree of concurrency in the design, development, test, and production of your Mod. The decision to prototype, or trial installation to confirm your production plan prior to entering fullscale production, should be made as a function of potential risk reduction and opportunity to improve on life cycle cost during the modification. Too often, as in the case of the B-52D, the need date for the modified system drives a schedule that requires concurrency. Twenty-three of the eighty B-52Ds to be modified were on the production line before the first modified B-52D flew (9). There were a large number of disturbed functional systems, i.e., fuel, hydraulic, electrical, and large amounts of old aircraft structure to be mated to new structure during the B-52D Mod. There were a tremendous number of problems encountered, primarily fuel and pneumatic duct leaks, on the first production lot of thirteen aircraft. As a result, the production line was halted, corrective design changes made and retrofit accomplished on those aircraft on the production line. Prototyping in this case would have greatly reduced the number of problems encountered. The penalty for prototyping is schedule, and possible workforce and facilities disruptions. To tool and labor "up" for a major production modification to produce one aircraft, and then shutdown to await flight test and operational evaluation on that aircraft can be very costly and time consuming. In the case of the

C-5A re-wing, even at rate production, it will take eight months to produce a modified aircraft. Close planning and coordination is required among your program office, the contractor, AFLC Depot, and the user, to reduce the risks of concurrency as much as possible. The AFLC Depot and the user can assist by inspecting and performing test/analysis on as many of the anticipated salvaged parts and disturbed systems by Aircraft Condition Inspections (ACI) performed during Programmed Depot Maintenance (PDM) or Field Nondestructive Inspection (NDI). The contractor can refine both his production manufacturing plsn and spare/repair parts estimates by performing Manufacturing Engineering Technology Studies (METS) on attrited aircraft or aircraft parts, or in the case of the C-5A, old fatigue test articles. The program management office (PMO) needs to coordinate with the using command for as early as possible input of the first aircraft to be modified. An early input and early teardown will allow both the PMO and the contractor to gather data on the condition of both aircraft <u>systems</u> and <u>structure</u>. This data, integrated with the ACI/NDI data, may allow concurrency risk reductions, and thus allow production to begin, at a reduced rate, before full prototyping is complete, and yet not incur the risk of full scale production. An alternative to allevaite possible labor force and facilities problems with prototyping is to have a second or third "pre-production" unit scheduled in production to stabilze the

manufacturing process flow, and yet not incur the full risks of concurrency. The C-5A re-wing prototype program utilized both early input of the first aircraft to be modified and METS. Both efforts provided valuable information, and as a result, design and manufacturing changes have been made which will improve the fleet modification scheduled to begin early in 1982. Both programs, input and METS, could have been pursued much more rigorously, and thus provided greater program payback, by top management, both government and contractor (33 & 13).

Along with the efforts to reduce concurrency risks, the user and depot must, working with the PMO, investigate life cycle cost improvements that can be made by virtue of the aircraft being down and dismantled for your major modification program. It does not make good business sense, nor is it being responsible to the American taxpayers, to expend capital resources to fix or improve a weapon system, and then reassemble in that system known or suspected defective parts, structure, or high Operational and Support (O&S) cost systems, just because those parts, structure, or high O&S cost systems were not directly responsible for the original modification justification. Realizing that many product improvement programs (PIP) and engineering change proposals (ECP) maybe outside the scope, and thus funding authorization, of your Mod does not mean that PIP/ECP should be ignored. It does mean that closer communication and

coordination is required. On the B-52D, the outboard wing fuel cells were salvaged and reinstalled as is because it was not in a structurally modified area of the wing. Once the wing is "buttoned up," maintenance on this fuel cell is expensive and time consuming. The cell had a high failure/ leak history. It may not have been cost effective, had the aircraft's wing not been dismantled, to remove and replace these cells, but once dismantled for the wing Mod, these cells should have been replaced. There are dozens of like examples on both the B-52D and C-5A programs. The user and the depot must identify, budget, and integrate into your major Mod schedule such PIP/ECP and life cycle cost saving changes (9).

Pre-Contract Award

Next to the early communications and planning, pre-contract award and statement of work (SOW) planning is the most critical phase of your Mod. If this phase is accomplished effectively, the rest of the Mod should flow relatively problem free. All too often in the acquisition and modification business the painful, and costly, cry may be heard, ". . . but it wasn't in the SOW. . . . it's not covered by the contract. . . . we need some over and above (O&A) funds!" Each and every major Mod is different, again there is no cookbook, but certain actions can enhance your ability to manage your program unique problems.

Funding and Program Estimate Projects. In Chapter III, policy and type of Mod funding were addressed. In addition to the P1100 funds required directly for you Mod, you may require aerospace ground equipment/support equipment (P1200 funds), replenishment spares/repair parts (P1500 funds), initial spares/repair parts for new design parts (P1600 funds), and possible stock fund (SF) and depot program equipment maintenance (DPEM) funds. In your budgeting/funding coordination with your ALC, and other ALCs if they have IMs who are required to support your program, HQ AFLC, and HQ USAF/ACB, insure that these additional necessary funds to be allocated to your Mod are either material program coded (MDC) or control symbol numbered (CSN). You need your funds program coded so that you do not have to compete with the SM, or other system PMs/SMs, at your ALC, for these funds during the budget year (4:13). Currently, though each program at a given ALC budgets for its projected needs, when funds are apportioned to the ALC, unless coded, they are pooled (P1200, 1500, 1600, SF and DPEM). Each SM/PM then "competes" for funds based on need/priority and not necessarily by the budget the SM/PM submitted. If the funds are not program coded, and the PM/SM wants to insure that the funds he needs to support his major Mod are there when he really needs them, the PM/SM must flood the procurement staff at the ALC with all his purchase requests (PRs) on day one of the fiscal year (24). This

will work, but your ability to exercise financial flexibility later in the year is essentially lost on day one of the fiscal year, and if your estimates of the quantity of spare/repair parts are not 100% correct, this alternative is less than cost effective. You may have difficulty in your fight to get funds program coded for your Mod because it will reduce the financial flexibility of your ALC Commander. Again, your Mod is not the classic "turn on/off" kit Mod. Your spare/repair parts requirements are to support a process flow production effort. Failure to supply necessary spare/repair parts for the production line could mean work stoppage, and thus schedule slip. Estimated costs for a stoppage in the production line for the C-5A wing Mod exceeds $150,000 per day (1). Since spare/repair parts are furnished to the contractor as Government Furnished Material (GFM), the stoppage, thus the cost, would have to be paid by the Government. Your Mod is different from everyday business of an ALC, it must be approached and financially managed differently.

DODD 5000.2 requires:

> e.3.F.7 Cost of acquisition and ownership shall be estimated as a separate cost element and traslated into firm <u>design to cost</u> (DTC) and <u>life cycle cost</u> (LCC) requirements for the system selected for full scale engineering development. System program actions shall be evaluated against these requirements with the same rigor as the evaluation of technical requirements [32]. (Underlining and parenthesis added by author.)

DTC/LCC guidance is contained in DODD 5000.28, Design to Cost. The cost, complexity and duration of your Mod will determine the extent of your formal DTC/LCC program. The PM must decide early in his acquisition strategy what the program DTC/LCC goals and objectives are, and how the PM wants to manage to achieve those goals/objectives. The PM decisions on DTC/LCC must be clearly explained in the Statement of Work (SOW). A DTC/LCC program will add additional costs to your Mod program, but if managed to meet the goals and objectives, the payback will be substantially more than the investment. One significant reason the YC-141B prototype Mod program completed under budget was its design-to/produce-to cost program called Program Estimate Project (PEP). Early in the design phase, a design-to cost goal was set, by work break-down structure (WBS) for fabrication, assembly, and installation. With the cost goals as a base line, the YC-141 PMO met initially with the contractor every two weeks, reviewed and approved/disapproved hundreds of design, material and tool trade-off alternatives (19). According to Brig Gen Litke, YC-141B PM, it was the rigorous involvement of all personnel in the PMO, especially the PM, assisted by engineers and IMs from Warner Robins ALC, working closely with the contractor's program management team, that made the PEP program work (18). DTC/LCC is time consuming work, and challenges the contractor to think cost. Many contractors desire to approach DTC/LCC with the "big picture,"

perspective, and not become "bogged down in counting pennies." The YC-141B PMO did "count pennies," in fact, reviewed each and every one of the 1600 plus engineering drawings released for that Mod. YC-141B key DTC/LCC lessons learned are:

A. Design your DTC/LCC program early.

B. Insure that the contractor knows and understands your DTC/LCC program.

C. Insure that the program you design, and the program the contractor understands, gets into the RFP and SOW.

D. Be tough, on your people and the contractor, and instill a true DTC/LCC discipline among all from day one.

E. Insure you, the PM, have approval/disapproval on DTC/LCC or PEP trade-off changes, and properly document all meetings and decisions.

F. Use all of the outside functional and technical resources available to the PMO. Communicate what you are doing (5 & 18).

The C-5A wing Mod design/prototype program contained a DTC program similar to the YC-141B PEP. The C-5A PMO did not have frequent, rigorous review meetings with the contractor, did not have approval/disapproval authority, and reviewed very few engineering drawings. The DTC changes were "estimates" only, i.e., there was no contractual vehicle to insure their inclusion in the Mod production estimates. As a result, though the C-5A wing Mod DTC tracked and

reported substantial DTC savings during the design phase, these savings could not be found nor tracked in the production proposal as they were in the C-141B proposal.

Schedule and Statement of Work (SOW). Your schedule is the framework for your entire program, the SOW and the contract are driven by the schedule. With an exception for emergency Mods or war time acceleration, reasonable completion and delivery schedules must be agreed upon between the PM and the contractor which allow adequate time for work accomplishment, to include problem solving, particularly on initial modification units. Compressed schedules result in costly work around methods, premium labor, additional material and transportation costs, and the opportunity for marginal design and fabrication conditions. In an unhurried environment, necessary performance trade studies and DTC studies can be applied producing a better "first" design, and thus design changes can be minimized, and the contractor's manufacturing division can better evaluate producibility aspects. Also for your schedule consideration should be long lead time materials and components. These materials and components must be identified and become the pacing elements of your schedule. You must insure that your schedule allows for any new spare/repair parts that result from the Mod design effort to be available at the same rate as your unit deliveries. In the past, there were documented cases of using commands receiving delivery of modified

units, but without the necessary spares support. As discussed in both Chapter II and III, there is the possibility of other concurrent work; PIPs, ECPs, TCTOs, and PDM, being accomplished during your modification program. Schedule interfaces should be thoroughly defined and costs, if possible, should be developed on the total package rather than being handled independently. Approach your schedule knowing that, though your goal is to have few or no formal design or scope changes not covered in the SOW, historically there will be a substantial number. Therefore, your schedule should allow for changes, and you should insure that procedures are established, very early in the program, to allow for the timely and orderly processing of proposed changes. Delayed change decisions and paperwork processing can significantly impact your cost schedule.

With your schedule as your framework, the SOW becomes the "material and instructions" for building your program. What is in the SOW is what the contractor will produce to, legally no more and no less. The contractor is a businessman. To be successful in business one must be smart, have resources to allocate productively, and maintain the maximum amount of management and fiscal flexibility. The contractor will approach your SOW with these basic business principles. If it is in his best interest to be specific in an area of the SOW, he will, if it is in his best interest to have flexibility in an area of the SOW, he will be nonspecific.

You and your PMO, with assistance from the contractor, should write an SOW for exactly what you want the contractor to do; not have the contractor write an SOW that states what he wants you to buy. Tailoring of Military Specifications (Mil Specs), Data Item Descriptions (DID), and the possible use of commercial specifications should be fully investigated and incorporated into the SOW. Mil Specs, in general, are developed for new production activities. In some cases there may be specs that should not be applied to modification programs without changes to make them compatible with the goals of your modification program, i.e., if the aircraft being modified was designed, built and tested to a specific design handbook, unless safety is a consideration, the modification should not be required to be designed and manufactured to a handbook design that is not compatible with or exceeds the requirements of the basic airframe. Substantial cost and schedule impacts can result from unwarranted application of certain Mil Specs. Again, the contractor can assist the PMO, and offer cost effective commercial specification alternatives, but it is not the contractor's job to tailor Mil Specs, Design Handbooks, or DIDs. It is your PMO's responsibility, working with the using and supporting command. Additional SOW considerations, taken from lessons learned on the B-52D program, are listed in Appendix C. There is no special order of importance in the list.

Governemnt Furnished Material (GFM) and Over and Above (O&A). Probably the most unique program aspect that sets a major modification apart from a major new system acquisition is GFM. GFM is any part, component, material or data furnished to the contractor by the government for use or consumption as necessary to complete the modification (10:15). Each aircraft; the C5A, C-141B, B-52D, and KC-135, is a piece of Government Furnished Property (GFP), and all supplies and materials required to support those aircraft are GFM or Government Furnished Aeronautical Equipment (GFAE). In Chapter II the importance of configuration control was stressed. When the government provides a contractor with GFM/GFP, the contractor expects and thus quotes his proposal to the government as if the GFM/GFP conforms to a standard or specified configuration or condition, i.e., fully operable and in compliance with published specifications or technical orders. As Bryant points out, the condition and configuration of a CI is often a true variable because:

> . . . of the world wide dispersion of weapon systems, the sheer size of the inventory to support some weapon systems, the multitude of different missions that a particular w/s performs, and thousands of different persons performing maintenance, modifications or maintaining the administrative records on configuration for a given system [10:17].

The older the w/s, the more compound the configuration problems.

Costs dictate that many parts and components on a

major mod program be salvaged from these CIs and reused, and thus are GFM. Because of the variable condition and configuration of the CI, it is very difficult for a contractor on a large Mod program to accurately predict those parts which can be salvaged and those which should be made new or be furnished new through the government supply system as new GFM. The value of early teardown, tests, ACI/NDI, and PDM inspection was stressed earlier and is stressed again as a means of increasing the accuracy of the salvage/make new prediction, and yet will not solve the problem completely. Each and every part or component on an aircraft, as well as the materials and fluids necessary to support it, is managed by an Item Manager (IM) or System Manager (SM) somewhere in the federal government system unless the part, component, material/fluids are specifically identified as Contractor Furnished Material (CFM). Therefore, the importance of early identification of salvage versus make new parts and components is a must in order for the various IMs to be able to order GFM to support the production line, support any new spares requirements, and to change future forecasts/inventories if a component or part is to be redesigned or deleted. Because your requirements may cross command, cross services, and even cross other federal agencies, the IM interface task is a cumbersome and slow process. This process can grind your production line to a halt if the coordination, ordering, and shipment of GFM is not done correctly and completely.

The B-52D program had significant problems in the IM supplied GFM/GFP area that affected both cost and schedule. IM coordination in some areas failed, and in order to keep the program on schedule, the contractor, as CFM, was paid additional costs to fabricate or refurbish parts and components that should have been furnished as GFM/GFP. In addition, lack of refinement of estimates of needed parts/components, as well as IM coordination on "turn on/off" of the supply pipeline resulted in an end of program excess of $1M in parts/components, of which only 48¢ on the dollar was recovered upon turn in. In additon, the program suffered a loss of approximately $500K to the stock fund for unused, but budgeted, supplies/services. Only 2 to 4% of the IMs were the "killer bees," but they were enough to cause problems. The task is a difficult one and, depending on the size and duration of your Mod will require special, early management attention. Resolving the right quantity at the right time for GFM/GFP problems will not in itself resolve all your GFM versus CFM problems. Understanding, coordination and cooperation with the IMs, as well as the Depot and using command, is required to insure that the GFM/GFP that is delivered to the contractor is not only in a serviceable condition, but that it will be serviceable for the <u>life of the production run</u> or that a replacement is forecast for any GFM/GFP that may not last the duration. Knowledge that even if properly planned for, some GFM/GFP will fail or be

defective, you should insure that your contract has provisions for the contractor to repair or refurbish GFM/GFP in a timely fashion to avoid schedule problems. Control and tracking of GFM/GFP problems could be incorporated into the charter of the Immediate Material Action Room (IMAR) concept described later in this chapter (9).

Early attention should be given to establishing the required level of quality for both the salvaged parts and the unmodified portions of the aircraft. Schedule and cost effectiveness must be considered. Mod program philosophy can vary considerably from redeliver "like new," i.e., to specification as if produced new, to redeliver "as is" except for modified areas. The PM, based on inputs from the major command user and AFLC, and considering funding availability and technical assessment, should insure that the SOW and contract are clear from the onset, and understood/accepted by all as to which quality level will be required on the modification being performed, the interface of the modification with the airplane, and the remainder of the airplane. The theme in Chapter II for single program responsibility is again important. Your Mod program objective must be to redeliver a functional weapon system that meets the SON/MENS as per PMD direction. If technical or mechanical problems occur that are not directly related to your modification, but prevent either the W/S continuing down the production line or being redeliverable, you must have,

within the scope of your program, provisions to deal with and rectify such problems. Since even the best of planning cannot cover all problems or "hidden damage" on any given aircraft, the recognition of and planning for Over and Above (O&A) is key. A candid view of the problem is expressed by a PM from a major aerospace contractor:

> Over and above work is frequently a troublesome area from a definition, funding, and contractual point of view. This item is often ignored until the contract is being implemented and is at times a very large cost item. Early recognition of O&A, a complete understanding between the Air Force and the contractor on what it is and how it is to be handled, and a detailed expression of this understanding in the contract will alleviate this problem. (Underlining added by author.)

The PM must transcend command loyalties to resolve the problems associated with O&A. The reason your Mod was authorized, in a priority system described in Chapter II, is because the Air Force has a defect that requires a "fix" or a need for an improved operational capability. The Air Force must accept the reality of O&A, and if the particular Mod is a joint command program, AFSC/AFLC, the respective PMDs must direct the proper planning and coordination for O&A, and must do so in a timely fashion so that O&A estimates are factored into overall program costs and these costs can be budgeted into the PPBS. The program and the overall AF objective suffers if the various PMOs assume a "not my responsibility" approach to O&A. Your responsibility is to identify, develop best estimates, and insure that O&A is

funded. Your PMO's responsibility is to develop an approval and tracking system that allows control of O&A.

A system developed by the B-52D PMO, after O&A had gotten out of control on the re-wing program, and a system now in use by the C-141B PMO on their Mod, was called Immediate Material Action Room (IMAR). At the start of the B-52D program, O&A was not well defined. There were documented cases of contractor personnel using improper procedures in removing salvaged parts and components, and thus damaging the parts and components. Since these parts and components were not part of the structural modification per se, their repair/refurbishment was O&A. It was possible to save man-hours by improper removal/storage of parts, and if said parts were damaged, the contractor would be paid to fix the parts. The IMAR concept involved placing a program management representative with engineering and quality personnel and an Administrative Contracting Officer (ACO) in a room on the production floor. If the contractor felt he had work that was outside the scope of the work in the SOW, he presented his case to the IMAR, i.e., brought the damaged part/component in or escorted the IMAR Team to the aircraft in question. There, on the spot, the contractor and the PM, or his representative, supported by the IMAR personnel, made a determination; is the part, component, or area of the aircraft to be repaired:

1. Within the scope of the SOW?

2. Outside the scope of the SOW, but as a result of negligent damage by the contractor?

3. Outside the scope of the SOW, and resulting from factors outside the control of the contractor?

If determination was either one or two, the contractor was instructed to fix the problem within the cost of the contract. If the determination was three, the ACO would immediately authorize the contractor to incur cost and repair the problem. The repair was not subject to the terms/conditions or profit of the basic contract, but was charged as O&A against a time and materials (T&M) contract, i.e., material and labor cost, very low constant fee. The T&M repair approach removed any possible incentive for the contractor to be careless in the removal and storage of salvaged parts/components. Following the implementation of the IMAR concept, substantial reduction in the number of O&A cases was enjoyed by the B-52D PMO, and a like experience is presently enjoyed by the C-141B PMO. It is recommended that the IMAR concept be slightly modified to include a representative(s) from the using command, and that the user input be evaluated by the IMAR team. The user may have to fund for a portion, if not all, of the O&A not directly related to the modification. The user may determine that he can more cost effectively handle some of the O&A cases after the aircraft is returned to its home base or during the aircraft's next scheduled PDM, and thus reduce costs since contractor

materials and labor are, in most cases, more expensive than organic resources available to the using command. Resolution of O&A funding and contractual control is a major problem currently being worked by the C-5A PMO. O&A on the C-5A was a "stepchild" that management failed to deal with early enough to avoid major intercommand resolution problems (1 & 33).

Contract Execution

Once your SOW is complete and a contract formulated to execute the SOW and satisfactory negotiations completed leading to contract award, another critical phase of your program begins. Your function now is to analyze your Mod's progress, anticipate problems and formulate alternatives. Assuming your Mod program is effective, strive to make it more efficient. Program Management Reporting (PMR) and its analysis coupled with frequent and active meetings with the contractor's program management team are effective tools for the accomplishment of your management tasks. Reports should bbe tailored to provide only data that will be used by you and your staff. It is essential that any schedule or socpe changes, i.e., ECPs or exercising of contract options, are known by every agency associated with the support and progress of your program, and the data feedback loop you established back in your mod's conceptual phase still functions. This feedback must include data from the user and the Depot

about changing condition of the aircraft, mission usage, or maintenance concept changes. This data must be evaluated and worked into your program. Not only does information have to continue to flow, but timely contractual changes must be made,

> As the contractor is required to produce on schedule and submit timely reports, an Air Force program manager should organize his staff and establish procedures to provide timely responses and direction to the contractor [5].

To aid in achieving this objective, you should consider streamlining the process/approval of changes within your PMO and also consider a concept developed by the C-141B PMO. The Air Force Plant Representative Office (AFPRO), AFCMD, functions to assist the PMO in the execution and administration, on site at the contractor's facility, of your Mod program. The C-141B PMO, through a Memorandum of Agreement (MOA) with the AFPRO at Lockheed and HQ AFCMD, established a Depty AF Plant Representative (Dep AFPR) for the C-141B. The small office, reporting to the AFPRO, is 100% dedicated to the C-141B Mod program, and is jointly manned by personnel from AFCMD and from Warner Robins ALC (personnel detached from the C-141B PMO at WR-ALC). This office has met with significant success in resolving and expediting C-141B problem solutions at the contractor's plant. Organization and formation of a similar office for your program may require extensive time and coordination with your parent ALC and AFCMD. Again, start the planning and execution wheels

turning early. The AFPRO can be a valuable asset if properlyby your PMO (5 & 18).

Another management tool that can assist you during program execution is staying abreast of and continually updating lessons learned from other programs and other contractors, where proprietary data is not involved. The design, test, and production of your Mod may span many years. Manufacturing technology is a dynamic science. You must keep your PMO and contractor current on new technology, and apply changes to your program where cost effective. Lastly, use of AF sources and resources to solve problems and enhance the effectiveness and efficiency of your program. Contract execution is no time to abandon the team concept. Your Mod is a DOD Mod, use your resources.

Anticipated Problem Areas

As previously established throughout this guide, each Mod will be different, and present each PM with unique situations and conditions that no guide could possibly have anticipated. There are a few general problems that appeared in all of the modification programs that this author researched for this guide. Because of the uniqueness of each Mod, alternatives are offered, but are not intended to be solutions in every case. These lessons and situations are offered for your consideration and possible future staffing by your PMO.

Labor; Government and Contractor. In Chapter II, the need to form a Program management Office (PMO) as soon as possible was stressed. Brig Gen Donald Litke, YC-141B PM, attributes much of his success to the early formation of a small, highly qualified and motivated PMO that was 100% dedicated to the YC-141B Mod program, and the outstanding support his PMO received from the Commander, WR-ALC, and the Commander's staff. The dilemma with government labor is twofold; quality and longevity. To recruit highly qualified and motivated personnel is challenging but possible. The problem is, especially if the personnel are Civil Service, that if in fact they are highly qualified and motivated, they may get promoted out of your PMO. Secondly, longevity; the YC-141B PMO was formed in 1975 and the program is scheduled to run to 1982, a seven year plus span. Industry enjoys the benefits from "corporate knowledge" gained by personnel stabilization on a given program. The government personnel system, especially for uniformed military, does not always follow the stabilized/"corporate knowledge" assignment policy, and thus program continuity is often lost. This can adversely affect your Mod, and place your PMO personnel at a disadvantage with their contractor counterparts. Early and higher command support is needed to ensure that if a person is deserving of promotion or recognition, he or she, miliatry or civilian, can be promoted or recognized within the PMO, i.e., a promotion does not

dictate reassignment. In addition, personnel policy must be changed to allow for stabilized tours without adversely affecting one's promotion/career progressing opportunity. Quality and longevity are highly political issues. Selling your program management strategy and objectives and securing the necessary support for quality and longevity will be an uphill battle all the way. The quality and longevity concept was applied successfully by the Navy in the selection and formation, in 1971, of the Navy's Cruise Missile Program office. The now Admiral Locke was the original PM and his PMO staff is essentially intact today and is lead PMO in the joint service development of a sea and air launched cruise missile system (17:14).

Labor and personnel problems are not unique to the Government. You must study and monitor your contractor's labor force composition, training, and contract status. Again, the duration of your total Mod may compound the above areas of concern. If your contractor, due to his current business base or overlapping schedules, must appreciably increase his labor force, the quality and motivation of the increased labor force may present problems. The B-52D suffered from high absenteeism and poor quality because many addiitonal hires were not experienced, skilled aerospace workers (9). Even if your contractor's labor force will not expand enough to be liable for the previous concern, you should be sensitive to age of the labor force. A program

with a life of five or greater years could involve a substantial labor force turnover. Labor strikes are also a fact of life, and the labor contract status of your contractor and his major subcontractor should be well known to you and those above you in the decision making chain of command. As stated by one of our responsible aerospace contractors,

> If a program should suffer a labor strike at the contractor's facility or one of his suppliers, great care should be given to assessing the true impact of lost time (cost and schedule). In some cases the impact may be more than a day-for-day slip because of slowdowns prior to the strike, inefficiencies in start-up, and morale degradation due to the conflict. (Parenthesis added by author.)

PM and PCO Relationship. A concern expressed by all PMs interviewed, government and contractor, was the program management and contracting relationship. The PM, and his PMO staff, work hard to incorporate into the SOW all agreements, clarifications, and interpretations concerning the Mod. You must insure, to preclude future disputes, that the contract language is clear, precise and reflects what you and your PMO agreed to with the contractor's PM and staff. Care must be taken that Mod goals and objectives are not lost during negotiation, nor is intended scope or work lost or changed as a result of final contract writing following negotiation. Your PCO is the legal extension of your authority. Insure that your Procurement staff knows the SOW and your pre-negotiation position and strategy, and keeps you

advised of any scope changes or protracted or acrimonious negotiations.

Additional Management Tools. As stated earlier, with a large Mod, extensive need for the use of GFP, to include support equipment, is a reality. Some of the GFP, especially support stands and equipment, will need repair, refurbishment or modification throughout the life of your modification. The prime contractor for the B-52D bid approximately $4.5M to construct, repair, refurbish, or modify certain GFP and support equipment (SE). The B-52D PMO evaluated the proposal and judged it to be excessive, and instead investigated potential qualified small local tool and manufacturing companies and contracted the work out to small contractors for approximately $400K; 10% of the original estimate. This subcontracting may not viable on all programs, but should be investigated if for no other reason than to demonstrate to your prime contractor your cost concerns and to establish a cost data base to assist in the evaluation of his GFP/SE proposals. Another tool employed by the B-52D PMO was the use of AFLC's Combat Logistic Support Squadrons (CLSS). These organic squadrons are normally assigned to the various ALCs. Because they have transportation equipment and expertise, these units can save you program dollars in the disposition of tooling and spares. In addition, because these units contain supply, transportation, and maintenance expertise, they can assist your PMO in

the evaluation of the contractor's proposal for packaging and transporting anything and everything associated with your program, to include the disposition of scrap. Again, there are many such organic resources available within DOD, find them and use them.

Chapter V

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Conclusion 1

Major production Class IV & V modifications, though having some unique characteristics like the amount of GFM/GFP, are essentially in work scope a process production effort similar to a major new weapon system acquisition.

Conclusion 2

Directives and policy for major production Class IV and V modifications are contained in more than twenty-seven DOD, USAF, AFLC, and AFSC directives, regulations, manuals and pamphlets. There are conflicts and inconsistencies in these documents for the AFLC PM because the directives are designed to direct or support either TCTO type "kit" modification, or new acquisition programs, but not a major production modification.

Conclusion 3

The AF Funding Manual, AFM 172-1, recognizes the need for, and provides a category definition for major production modifications which would allow for increased financial management flexibility, but current OSD/AF funding practice does not allow for this special classification,

and thus financial flexibility.

Conclusion 4

The Final Modification Approval Authority matrix, as per AFLCR 57-21, is not responsive to program change potential of a major production modification, nor does it provide the AFLC PM with a timely review/decision cycle required for daily program management responsibility.

Conclusion 5

To optimize program/project management of major production modifications within AFLC, authority, responsibility, and reporting changes would be required both at HQ AFLC, and at the ALCs.

Conclusion 6

HQ AFLC and AFALD are aware of the value of "lessons learned," and are actively pursuing and promoting lessons through an automated data system under AFALD/PTQ.

Conclusion 7

HQ AFLC has demonstrated, by the design, development, test, and now production of the C-141B stretch/air refueling modification that the command has the organic personnel resources to successfully pursue other major production Class IV and V modifications.

RECOMMENDATIONS

Recommendations 1

HQ AFLC staff and brief the Air Staff on a recommendation that a new program status be created between a TCTO kit modification and a new weapon system acquisition. The program may be titled as a major acquisition modification (MAM), and thresholds for an MAM be established after the study effort.

Recommendation 2

HQ USAF, drawing on program experienced personnel from AFSC, AFLC, and MAJCOMs, staff and recommend to the Secretary of the Air Force a single document, to be supplemented as necessary by AFSC or AFLC, for the processing, budgeting, funding, and execution of an MAM.

Recommendation 3

HQ USAF pursue the current USAF/ACB study/policy change request for budgeting and funding of major production modifications, and support OSD as necessary in their effort to negotiate with the House and Senate Appropriations Committees the required funding policy change to allow MAM similar fiscal flexibility enjoyed by major new weapon system acquisitions.

Recommendation 4

HQ AFLC adopt, to apply to MAM programs only, a

different final modification approval matrix than currently directed in AFLCR 57-21. The thresholds for a new approval matrix may be determined from the study results of Recommendations 1 and 2.

Recommendation 5

HQ AFLC, following the study efforts from Recommendation 1 and 2, restructure the authority, responsibility, and reporting of AFLC's and the ALC's organizational structure to allow for the formation of a PMO, and to optimize program/project management of an MAM. HQ AFLC should designate as a focal point an ALC, to act as the AFLC's "corporate knowledge" base for MAM administrative, personnel, and procedural data.

Recommendation 6

HQ AFLC and AFALD continue full support of AFALD/PTQ automated "lessons learned" system, and authorize a study to solve any problems with making the "lessons learned" data bank available, via remote terminal/printer, to every ALC as soon as possible.

Recommendation 7

HQ AFLC staff/request HQ USAF assign all MAM on weapon systems that have undergone PMRT from AFSC to AFLC, and that all HQ USAF PMDs direct program management responsibility to AFLC. Any technical assistance that exceeds

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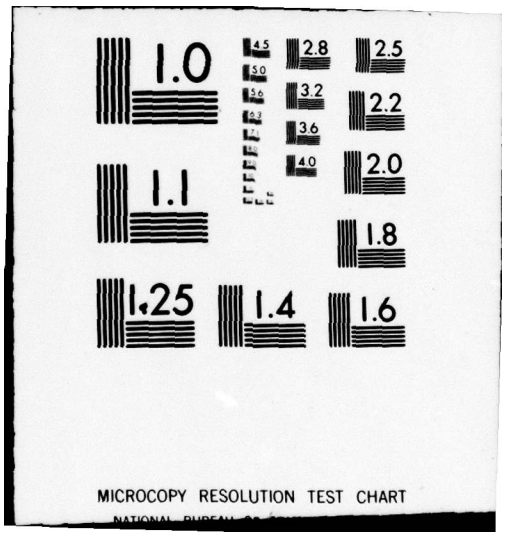
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MICROCOPY RESOLUTION TEST CHART

AFLC's engineering capabilities will be subcontracted by AFLC to AFSC. Concurrent with this HQ AFLC request, HQ AFLC pursue a rigorous program to identify highly qualified and motivated career personnel, military and civil service, for assignment to either the Defense Systems Management College (DSMC) or the Air Force Institute of Technology (AFIT) School of Systems and Logistics (LS). Personnel so identified and educated be placed in program/project management positions at the various ALCs, and consideration be given to career field stabilization that will not place these personnel in either promotion or recognition jeopardy.

Recommendation 8

HQ AFLC and HQ USAF consider the use of staff and faculty, or students in thesis status, from DSMC and AFIT/LS for further studies into the optimization of the Air Force's modification program, both major and minor, with the goal of increasing service life or improving our current weapon systems capabilities while reducing the cost of ownership of those systems.

Appendix A

APPENDIX A

GLOSSARY OF TERMS

Budgetary Cost Information (BCI). Preliminary cost data provided by HQ USAF to assist in the evaluation of the requirement and the development of Class V modification programs (AFR 57-4).

Configuration Item (CI). An aggregation of hardware or software, or any of its discrete portions, that satisfies an end use function and is designated by the Government for configuration management. CIs may vary widely in complexity, size, and type--from an aircraft or electronic system to a test meter or round of ammunition. During development and initial production, CIs are only those specification items that are referenced directly in a contract (or an equivalent in-house agreement). During the operational and maintenance period, any reparable (nonexpendable) item designated for separate procurement is a configuration item. In this document, "CI" and the term "system/equipment/conventional munition/computer program" are synonymous. The term includes:

a. Government furnished equipment (GFE), contractor furnished equipment (CFE), and spares.

b. USAF centrally procured, privately developed items, including commercial off-the-sehlf equipment, aerospace ground equipment (AGE), and training equipment.

c. Air Force-owned Automatic Data Processing (ADP) equipment, computer controlled equipment and their associated software and software documentation, when these are either physically incorporated into a weapon or integral to a weapon system from design or procurement viewpoints (AFR 65-3).

Deputy Program Manager for Logistics (DPML). The Logistics representative for major program/modification assigned to the Program Office (AFSC). The DPML is responsible for all logistic tasks and ensures that logistic participation and support capabilities agree with program objectives and that logistics support requirements are reflected in the system/modification design (AFSCP 800-3).

Engineering Change. An alteration in the configuration of a CI or an item (delivered, to be delivered, or under development) after formal establishment of its configuration identification.

Engineering Change Proposal (ECP). A proposed engineering change and the documentation that describes and suggests it (MIL-STD 480 and 481 apply).

Group "A" Kit. The items, parts, or components to be permanently or semipermanently installed in a CI to support, secure, interconnect, or accommodate the equipment provided in the retrofit change Group "B" kit.

Group "B" Kit. The equipment which, when installed in a CI with a Group "A" kit, completes a retrofit change. Normally, Group "B" items are removable.

Item Manager (IM). The AFLC ALC with management responsibility for commodity-type items by Federal Supply Class (T.O.-00-25-115), or the commodity manager of another service or the Defense Supply Agency, such as the 1155th Technical Operations Squadron (AFTAC), that acts as the IM for the Air Force Technical Applications Center (AFTAC).

Kit Proofing and TCTO Verifications. The actual trial installation, in accordance with the proposed TCTO, of the first production updating change or modification kit before release of normal quantities to the installing activities (T.O.-00-25-223). The purpose of kit proofing is to determine that kit parts are adequate and fit correctly, that technical instructions are correct, that skill levels required for the installation are correct, that special tooling is adequate, and that kits can be installed at the maintenance level prescribed by the TCTO in the intended installation environment. TCTO verification also applies to

TCTOs that are issued without supporting kits. The using command will accomplish this function if organizational or intermediate level assignment is planned. Kit proofing is in addition to the test and evaluation of the prototype kit by the command responsible for the kit engineering.

Modification Program Management Plan (MPMP). The modification proposal, analysis, and documentation to support it on a high risk or high cost modification (AFR 57-4).

Modification Proposal and Analysis (MPA). A comprehensive technical study and cost and schedule analysis that considers all aspects of a proposed Class V modification (AFR 57-4).

Statement of Operational Need (SON). A formal serially-numbered document giving a general description of operational capability deemed necessary at a specific time, outlining the capability desired rather than the means of accomplishment, describing the objective, operational concept, expected operational environment and other factors to be considered (AFR 400-3).

APPENDIX B

Appendix B

AFALD/PTQ KEY WORDS/DATA

MATERIALS
MATERIEL DEFICIENCY REPORTS
MATERIEL REVIEW BOARD
MATING
MAU-BOMB RACK
MEAN TIME BETWEEN FAILURE
MEASURING INSTRUMENTS
METAL
MICRODOT
MISSED MILESTONES
MISSILE
MISSILE ASSEMBLY
MISSILE RACK
MISSILE SILO
MISSION REQUIREMENTS
MODELS
MODIFICATION
MODULAR ENGINES
MODULES
MOISTURE
MONITORING
MONITORS
MOTHER BOARDS
MOTION BASE SIMULATOR
MOUNTINGS
MOUNTS
MSG-2
MULTIMETERS
MUNITIONS HANDLING EQUIPMENT

NAVIGATION
NEGOTIATIONS
NOISE
NOISE REDUCTION
NOSE CONE
NOSE WHEEL STEERING
NUCLEAR WEAPONS-CERTIFICATION

CONTROL NUMBER (90): 00090 — 77-02
AUTHOR (100): 00100 — L. C. SCOTT
RTIF

AC 10004 (4 OF 174 ANS)
ACCESSION NUMBER (10) 00010 — 10004
UPDATE DATE (20): 00020 — 79/06/13
CALL NUMBER (30): 00030 — CC2
TOPIC (40): 00040 — PROPRIETARY DATA
LESSON LEARNED (50): 00050 — ACQUISITION AGENCIES SHOULD INSURE THAT GOVERNMENT USE OF PROPRIETARY DATA IS A CONSIDERATION IN THE DEVELOPMENT OF A REQUEST FOR PROPOSAL (RFP). LIMITED DATA RIGHTS SHOULD BE HELD TO AN ABSOLUTE MINIMUM TO PRECLUDE POST ACQUISITION LOGISTIC SUPPORT PROBLEMS.
PROBLEM (60): 00060 — ACQUISITION OF GOVERNMENT RIGHTS TO USE BOEING 747 (E-4) PROPRIETARY DATA FOR COMPETITIVE PROCUREMENT OF FUTURE E-4 MISSION SYSTEM MODIFICATIONS.
DISCUSSION (70): 00070 — DURING THE ACQUISITION OF THE BOEING 747 (E-4) A/C NO PROVISIONS WERE MADE TO OBTAIN NECESSARY DATA RIGHTS. THE ACQUISITION CONTRACT ISSUED CONTAINED RESTRICTIVE LANGUAGE AND REQUIRED CONTINUED NEGOTIATIONS WITH BOEING TO OBTAIN NECESSARY ENGINEERING DATA SO THAT FUTURE SYSTEMS MODIFICATION CONTRACTS WOULD PERMIT COMPETITIVE BIDDING. PAST EXPERIENCE INDICATES THE RESULTANT SOLE SOURCE CONTRACTING WOULD COST FROM TWO TO FOUR TIMES AS MUCH AS COMPETITIVE PROCUREMENT.
APPROPRIATE ACTION (80): 00080 — THE GENERAL APPROACH FOR DEALING WITH THIS PROBLEM IS TO OBTAIN THE CONTRACTOR'S AGREEMENT, AT THE TIME WHEN COMPETITION EXISTS, TO FURNISH DATA AND RIGHTS PERTAINING TO THE ITEMS EVENTUALLY PRODUCED AND UNDER CONTRACT. (REF. ASPR SUP TO 9-202.2 (D) (2) (G). VARIOUS TYPES OF AGREEMENTS). SECTION "J" OF THE RFP SHOULD INCLUDE THE SPECIAL DATA PROVISIONS WHICH THE GOVERNMENT DESIRES, AND SECTION "C" SHOULD CONTAIN APPROPRIATE INSTRUCTIONS PERTAINING TO SPECIAL DATA PROVISIONS. THE CONRACT SHOULD INSURE THAT THE GOVERNMENT WILL HAVE THE RIGHT TO ORDER/USE DATA FOR FOLLOW ON TASKS.
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00100 — R. PEPASKY

APPENDIX C

Appendix C

B-52D LESSONS LEARNED

1. List all disturbed systems, establish contractor responsibility, and extent of system pre and post mod tests.

2. Define maintenance concept for electrical systems/components; storage and post most functional/bench test.

3. Determine what will be done/responsibility if a repaired or reworked part is rejected.

4. Establish with AFLC/MAJCOM user the responsibility of the cost of handling input 781 write-ups.

5. Be aware of problems associated with the disposition/salvage of life support/780 equipment.

6. Budget funds for rework of defects on GFP during initial contract phases.

7. Attempt to have O&A administered by personnel who participated in the negotiation of the contract. Usually they're the only ones who know what's in the contract.

8. Avoid reliance on optimistic depot repair schedules (MISTR); consider need dates and leadtime away plan.

9. Evaluate MICAP items which the contractor has identified as spare requirements.

10. Review the Not Mission Capable Supply (NMCS) history of your aircraft for problem areas. Assess impact on mod. Lay-in insurance items to cover.

11. Insure there is a replacement part for every removed part - lost or damaged salvaged parts are a problem.

12. Develop a system to confirm the condition of rejected parts, and investigate possibility of repair of a replacement part/material is not delivered to meet production schedule.

13. Require forward supply point balances to be included in the contractor's GFM/GFP inventory reports.

4. Established requirements in the contract for frequent government parts inventory, and insure property removed from Bond Room to another is accounted for.

15. Set a level that contractor should have on hand. Do not allow excess spares on hand.

16. Insure the contractor can track shipments and receipt of GFM/GFP.

17. Avoid too liberal C/SCSC tolerance thresholds. Keep bottom line overage cost as tight as possible.

18. Attempt to have your work breakdown structure (WBS) down to as low a level as can cost effectively managed; avoid multi-million dollar WBS elements.

19. Do not allow mod/DMIF funds within the WBS.

20. Establish compatibility between WBS and price proposal. See that the contractor adheres to his price proposal. This allows comparison of actual & negotiated values.

SELECTED BIBLIOGRAPHY

SELECTED BIBLIOGRAPHY

REFERENCES CITED

1. Air Force Logistics Command. C-5 Program Manager Memorandum to HQ AFLC/LO on C-5A Wing Modification Over and Above. WPAFB, OH. July 1979.

2. _____, Air Force Systems Command. Class V Modification Management. AFLCR/AFSCR 57-3. WPAFB, OH. December 1970.

3. _____. Modification Program Approval. AFLCR 57-21. WPAFB, OH. 12 April 1979.

4. _____. Material Program Management Control. AFLCM 401-1(C-2). WPAFB, OH. 17 August 1973.

5. Atkins, A. G., and Major Hershell R. Hubbard, USAF. Air Force Plant No. 6, Marietta, GA. Personal interview conducted 18 March 1979.

6. Balven, Captain Terry L., USAF, HQ AFLC/XRX, WPAFB, OH. Personal interview conducted on 26 January 1979.

7. _____. "Air Force Management of Class V Modifications," AQI Project Report 77-6. AFALD/AQI, WPAFB, OH. 10 June 1977.

8. _____. "Acquisition of Class V Modifications," AQI Project Report 77-22. AFALD/AQI, WPAFB, OH, 16 February 1979.

9. B-52D Program Office. B-52D Lessons Learned Tape. Oklahoma City ALC, OK. 14 January 1979.

10. Bryant, Herbert G. "The Program Manager in AFLC." Unpublished report, Defense Systems Management College, Fort Belvoir, VA., 1974. AD-A039562

11. Chan, Sherman, USAF. AFALD/PTQ, WPAFB, OH. Personal interview conducted 23 July 1979.

12. Cilvik, Lt Col Reginald M. "Class V Modification Management and Planning: A Guide for the AFSC Program Manager of Less-Than-Major Systems." Unpublished report, Defense Systems Management College, Fort Belvoir VA., 1977. AD-A042941.

13. Finley, Lt Col Theodore, USAF. C-5A Wing Modification Program, HQ ASD/SD-28L, WPAFB, OH. Personal interviews conducted intermittently from 14 August 1978 to 20 July 1979.

14. Fredrickson, Richard and Diana Graves. HQ AFLC/LOAP, WPAFB, OH. Personal interview conducted on 2 February 1979.

15. Hersey, Major Nelson, USAF. HQ USAF/ACBMD, Washington. Interview 1]7 July 1]979.

16. Kubecka, Captain Frank A., USAF. "Class V Modifications: Problems in Improving Existing Weapon Systems and Equipment." Unpublished study, Air Force Command and Staff College, Air University, MAxwell AFB, AL, 1978. LD-42331A.

17. Lenorovitz, Jeffrey M. "Cruise Missile Competiton Flyoff Begins," Aviation Week and Space Technology. 3 July 1979, pp. 14-15.

18. Litke, Brig Gen Donald P., USAF. Vice Commander, Oklahoma City ALC, OK. Personal interview conducted 17 July 1979.

19. Lockheed-Georgia Company. Element Summary Report; C-141 Modification Program. Report No. 24, Marietta, GA. 15 March 1979.

20. McChesney, Lt Col Jack L., USAF. Instructor, Department of Functional Management, AFIT/SL, WPAFB, OH. AFIT Course F.M. 523, "Contracting and Acquisition Management," Class 1979B. Lecture notes. Fall 1978.

21. Meadows, R. A. Program Manager, Lockheed-Georgia Company. Letter, input data for AFLC PM Guide. 5 June 1979.

22. Murdock, Captain Robert, USAF. HQ Military Airlift Command/XPQ, Scott AFB, IL. Personal interview conducted 23 June 1979.

23. Office of Federal Procurement Policy. "Major System Acquisition: A Discussion of the Application of OMB Circular No. A-109." OFPP Pamphlet No. 1. Washington: Government Printing Office, August, 1976.

24. Peterson, Pete, USAF. Deputy Program Manager, C-5A Wing Modification Program, San Antonio ALC, TX. Personal interview conducted 17 December 1978.

25. Stark, F. T. McDonnell Douglas Corp. Briefing, "Overview of Major System Acquisition Policy." July 1979.

26. U.S. Department of the Air Force. Statement of Operational Need (SON). AFR 57-1. Washington: Government Printing Office, 14 June 1979.

27. _____. Modification Program Approval. AFR 57-4. Washington: Government Printing Office, 1 September 1978.

28. _____. Configuration Management. AFR 65-3 (Change 1). Washington: Government Printing Office, 1974.

29. _____. Acquisition Program Management. AFR 800-2. Washington: Government Printing Office, 14 November 1977.

30. _____. USAF Budget manual Policies and Procedures. AFM 172-1 (C3). Washington: Government Printing Office, 11 May 1977.

31. U.S. Department of Defense. Major System Acquisition. DODD 5000.1. Washington: Government Printing Office, 18 January 1977.

32. _____. Major System Acquisition Process. DODD 5000.2. Washington: Government Printing Office, 18 January 1977.

33. Wolverton, Col James R., USAF. AFLC C-5A Wing Modification Program Manager, HQ AFLC, WPAFB, OH. Personal interview conducted intermittently from 7 October 1978 to 20 June 1979.

B. RELATED SOURCES

Aeronautical Systems Division, Air Force Systems Command. SD-29L "C-5A Wing Modification Program Integrated Logistics Support Plan (ILSP)," WPAFB, OH. 31 August 1978.

Air Force Logistics Command. Modification Program Data. AFLCR 27-1. WPAFB, OH. 23 January 1976.

_____. Class IV Modification Budgetary Requirements. AFLCR 57-12. WPAFB, OH. December 1977.

_____. Systems and Equipment Modification/Maintenance Program (G079). AFLCR 66-1. WPAFB, OH. 30 May 1979.

_____. Program Management. AFLCM 800-1. WPAFB, OH. 29 December 1972.

_____. "Acquisition Logistics Handbook for Deputy Program Managers for Logistics." AFLC DCS/AQ. WPAFB, OH. March 1975.

Air Force Logistics Command, Air Force Systems Command. Acquisition Logistics Management. Draft AFLC/AFSC Pamphlet 800-XX. WPAFB, OH. No date.

Air Force Plant Representative Office. C-141 Stretch Production Program Contract Administration Plan. F09603-78-C-1473. Air Force Plant No. 6, Marietta, GA. No date.

Air Force Systems Command. A Guide for Program Management. AFSC Pamphlet 800-3. Andrews AFB, MD. April 1976.

Berger, Calvin C., and Captain Donald E. Haslan, USAF. "Evaluation of Management Responsibilities in the Air Force Aircraft Modification Program." Unpublished master's thesis. SLSR6-73B, AFIT/SL, WPAFB, OH, August 1973. AD769188.

Bush, Captain Don G., USAF. "An Analysis of Modification Development through Material Improvement Projects." Unpublished master's thesis, SLSR7-73B. AD89262.

Coleman, Major Charlie J., Jr., USAF, and Captain Thomas R. Edison, USAF. "Development of Systematic Technique for Analyzing the Effectiveness of Aircraft Class IV Modifications." Unpublished master's thesis, LSSR-10-78B, AFIT/SL, WPAFB, OH, September 1978. ADA060551.

Dallas, C. H., Chief Engineer-Design, Lockheed-Georgia Company. Letter, input data for AFLC PM Guide. 13 June 1976.

Knowles, Joel B., Major, Major Martin D. Martin, and Lt Col Larry L. Smith, USAF. "Acquisition Management for Logisticians," Course material readings for Acquisition Logistics (FM 6.14), School of Systems and Logistics, Air Force Institute of Technology. WPAFB, OH. 24 August 1979.

Office of Management and Budget. Major System Acquisition. MB Circular A-109. Washington: Government Printing Office, 5 April 1976.

Schuler, C. J. KC-135 Programs, Boeing-Wichita Company. Letter, input data for AFLC PM Guide. 16 May 1979.

U.S. Department of the Air Force. Full Funding of Air Force Procurement Programs. AFR 172-14. Washington: Government Printing Office, 6 July 1978.

U.S. Department of Defense. Full Funding of DOD Procurement Programs. DODD 7200.4. Washington: Government Printing Office, 30 October 1969.